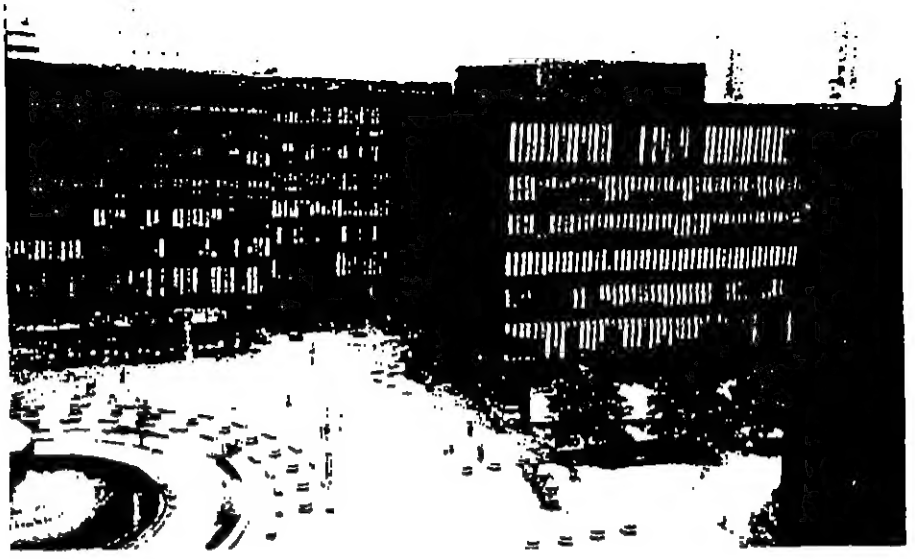
WTCI-10-P

PROPERTY CONDITION ASSESSMENT
OF
WORLD TRADE CENTER PORTFOLIO



FIVE WORLD TRADE CENTER

Located In

NEW YORK, NEW YORK

Prepared For

THE PORT AUTHORITY OF NY & NJ
WORLD TRADE CENTER COMPLEX
NEW YORK, NEW YORK 10048

Prepared By

MERRITT & HARRIS, INC.
110 East 42nd Street
New York, New York 10017
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FINAL DRAFT

Property #5
Merritt & Harris, Inc. Project Number 20-251E

CD File SK011670

20-251E

December 6, 2000

Mr. Jeffrey S. Green
General Counsel
The Port Authority of NY & NJ
1 World Trade Center
New York, New York 10048

Re: Due Diligence Physical Condition Survey
World Trade Center
New York, New York

Dear Mr. Green:

Enclosed are 7 copies of our report of the conditions observed during our site visits to the referenced property between September 13 and October 31, 2000. For this report, I served as the Project Coordinator, with Peter J. Brady, P.E., as Project Manager and Structural Engineer, and Jack M. Kagan and Joseph Marciano, P.E., as Mechanical/Electrical Engineers.

As previously agreed, Merritt & Harris, Inc. has divided the report into 7 segments as follows:

1. One World Trade Center (Tower A)
2. Two World Trade Center (Tower B)
3. Retail Mall and Plaza
4. Four World Trade Center (Southeast Plaza Building)
5. Five World Trade Center (Northeast Plaza Building)
6. Central Services
7. Subgrade

For convenience, identical copies of Sections I - IV (I - Identification, II - Objective, III - Procedures and Limitations, and IV - Executive Summary) have been included with each report so they can stand independently, if required to do so.

Thank you for selecting Merritt & Harris, Inc. as your consultant on this project. If you have any questions, please call me.

Very truly yours,

MERRITT & HARRIS, INC.

Robert G. Weiland, R.A.
Vice President & Principal

RGW:rw
Enclosure

cc: Thomas C. Richard
Peter Brady
Jack Kagan
Joseph Marciano

REPORT OF
DUE DILIGENCE PHYSICAL CONDITION SURVEY
WORLD TRADE CENTER

Located At

WORLD TRADE CENTER COMPLEX
NEW YORK, NEW YORK

Prepared For

THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
1 WORLD TRADE CENTER
NEW YORK, NEW YORK 10048

Prepared By

MERRITT & HARRIS, INC.
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7. Subgrade

SECTION I - IDENTIFICATION

Project Name: World Trade Center

Location: One - Five World Trade Center
New York, New York 10048

Report Prepared For: Mr. Jeffrey S. Green, General Counsel
The Port Authority of NY & NJ
1 World Trade Center
New York, New York 10048

Site Visits and Report By:

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President and CEO
Merritt & Harris, Inc.

Robert G. Weiland, R.A.
Project Coordinator
Merritt & Harris, Inc.

Peter J. Brady, P.E.
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Elevator Field Engineer
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Elevator Field Engineer
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William G. Young, P.E.
Facade Consultant
Heitmann & Associates

Wayne Crandlemere
Environmental Consultant
Crandlemere & Associates

Port Authority Personnel Present During Visits:

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Dates of Site Visits: September 13 - October 31, 2000

SECTION II - OBJECTIVE

The purpose of the on-site evaluation and document review is to assess the general physical condition of the property as it currently exists. This report provides a narrative and photographic description of the buildings, as well as a listing of any deficiencies that were noted during our site visit.

The report has been divided as follows into seven component sections for ease of handling:

1. One World Trade Center (Tower A)
2. Two World Trade Center (Tower B)
3. Retail Mall and Plaza
4. Four World Trade Center (Southeast Plaza Building)
5. Five World Trade Center (Northeast Plaza Building)
6. Central Services
7. Subgrade

Each of the volumes contains descriptions of the component, recommendations for items requiring action, and photographs and supporting documentation specific to each component of the project. An overall Executive Summary, identical for all volumes, has been reproduced and included in each of the volumes for convenience. Shared site feature and service elements are described and discussed within the Executive Summary section. Due to the nature of the project, some of the construction elements may be shared or physically interconnected among 2 or more of the project components. As a result there may be some redundancy noted in the report in order to indicate the support of 2 or more project components by these systems.

The Recommendations section for each volume is a listing of items that will require action within the next 10-year period. **Immediate (0-1 Year)** issues are deficiencies which are in violation of codes, which pose a danger to public safety, or which, if left uncorrected, will lead to further deterioration of the property or significantly impact marketability or habitability. Issues that will require addressing during the second to the tenth years are divided into 2 categories, **Future (1-5 Years)** and **Future (6-10 Years)**. These categories represent work not required by agencies or codes, but which, in our opinion, are issues that should be attended to in the context of the prudent management of the property.

ADA compliance work is considered to be mandatory and is listed separately.

SECTION III - PROCEDURES AND LIMITATIONS

To adequately determine the present conditions at the World Trade Center (WTC), Merritt & Harris, Inc. performed on-site observations between September 13 and October 31, 2000. Mr. Leandro Zucchi, Assistant General Manager, Building Services Management of the Port Authority, acted as the Project Coordinator, arranging security clearances, providing knowledgeable escorts for the various components of the project, and facilitating review of available documentation. Over a period of several weeks, our field personnel physically observed the buildings, reviewed documentation, and interviewed Port Authority personnel regarding building conditions, operations and maintenance procedures, and capital projects.

Because of the physical complexity of so large a project, the separation of individual systems into definable areas for inclusion in the reports of the various buildings was not easily achieved. While we have attempted, with the assistance of Port Authority personnel, to assign systems to their associated buildings, the assignments are based on our opinion, with input from the Port Authority, of where the systems logically fall. As the division of buildings and systems into individual entities was never planned or previously assigned, any attempt to separate the buildings and systems for individual transactions should be carefully studied and documented. As we understand from the Port Authority that the WTC transaction will be accomplished by treating the complex as a single entity, the division of buildings and systems in this report has been done to clarify the reporting and simplify the task of reading so large a document.

Merritt & Harris, Inc. selectively reviewed documentation available in the WTC Data Center, located on the 3rd floor of 5 WTC. Merritt & Harris, Inc. focused on those items relating to the physical buildings, and did not review such items as financial reports and leasing documentation. The primary documentation used by Merritt & Harris, Inc. was from the following categories in the Checklist Items:

A. General Property Information
D. Environmental Information (Note that this information was not in the Data Room, but was provided to Mr. Crandlemere in the Port Authority office of Mr. Phil Taylor)
E. Operating and Maintenance Manuals
I. Structural Integrity Inspection Reports
J. Facades
K. Mechanical Reports/Information
L. Vertical Transportation Profile & Inspection Reports
M. Electrical Reports
N. Blast Related Reports/Information
O. Life Safety Code Analysis

Attachment 3 is the Due Diligence Checklist, or listing of available documents as of October 31, 2000.

In addition, a set of original construction documents was available on CD ROM format. A selective review of these drawings was done to familiarize our staff with the basic building layouts, material selections, and design criteria. Due to the volume of documentation available, an exhaustive plan, specification and code review of this property was not performed. Merritt & Harris, Inc. accessed these documents in an attempt to clarify issues raised by observations in the field or to further research references to building components mentioned in the reports by other consultants available in the Data Room.

Our observations were limited to those portions of the project that were visible during the walk-through. In many areas, building finishes concealed structural components from view. Merritt & Harris, Inc. neither took material samples nor performed tests on the building materials or systems. Our investigation of the building facades was performed from ground level and from the roofs.

Some equipment observed was not operating during our visit due to seasonal requirements. No attempt was made to operate the equipment as the facility was occupied and appropriate climate control was required. In the case of idle machinery or equipment, our opinions were formed by interviewing available personnel and reviewing any maintenance records presented to us. In order to be as fully apprised as possible of the operating condition of the major pieces of machinery, a Mechanical Contractor should be retained to start the equipment and witness its operation over a period of time.

While the Port Authority does have a basic emergency plan for dealing with flooding on the property, there is no existing control method to prevent catastrophic flooding of the subgrade levels up to level B-2 due to the total flooding of the PATH tubes. Pockets for control doors were built into the perimeter slurry wall, but doors were never installed, as this method of protecting the building would pose a life-safety threat to trains and passengers in the PATH tubes. The complexity of this problem and the specific expertise needed to address the issues is beyond the scope of competence of Merritt & Harris, Inc. and has not been addressed in this report.

It is not the intent of Merritt & Harris, Inc. to assume any part of the design responsibility, but rather to report our findings to our Client to whom this report is addressed. It is further understood that as building maintenance is ongoing, some areas of concern noted in this report may have been addressed subsequent to our site visit and may no longer be applicable.

The square footage areas used in the following sections are as provided in the J.P. Morgan Offering Memorandum, dated June 21, 2000 (the Offering Memorandum), and in the J.P. Morgan Property Book, dated June 21, 2000 (the Property Book). Independent field measurement of buildings and/or tenant spaces or plan takeoffs is outside the scope of this assignment.

On behalf of the Client, Merritt & Harris, Inc. engaged an independent consultant to conduct a **Phase I Environmental Site Assessment and Asbestos Audit** at the site in conjunction with the due diligence. The survey was conducted by members of the staff of R.W. Crandlemere and Associates, Inc. (Crandlemere) of Weymouth, Massachusetts. The survey included visual observations of the site and buildings, and the accumulation and review of available documentation pertaining to asbestos, hazardous waste, and electromagnetic radiation generated by the roof-mounted communications transmission equipment. Crandlemere took no samples and made no physical tests. The results of the survey and any associated recommendations are contained as attachments to this report. Merritt & Harris, Inc. assumes no liability regarding asbestos audits, hazardous or toxic material monitoring, surveying, or reporting and cannot be responsible for the

work or opinions of other independent consultants engaged to do so. Merritt & Harris, Inc. reviewed the subconsultant's report and extracted summary information for inclusion within our narratives for the convenience of the reader. The environmental subconsultant's reports are provided as attachments to the individual building reports and in their entirety in **Attachment 6** (separate binder) of this portion of the report.

On behalf of the Client, Merritt & Harris, Inc. engaged an independent consultant to conduct an **Elevator Review** at the site in conjunction with the due diligence. The survey was conducted by members of the staff of The BOCA Group International (BOCA) of New York, New York. The survey initially included visual observations of a pre-selected random sampling of 21 elevator and escalator devices at the buildings, and the review of available documentation pertaining to elevator maintenance and modernization programs. The sample elevators selected for observation were chosen to provide a representative specimen from each building and zone and included modernized, partially modernized, and original elevators. Following the initial sampling, BOCA further reviewed and observed additional devices based on callback data provided by the Vertical Transportation Department and on reports prepared by the Port Authority's independent elevator consultant. The reader should note that a bank of elevators (18-23B) was involved in a recent run-by incident. These elevators were not observed and have been excluded from our review to avoid interference with an ongoing legal investigation. The tenant-owned and operated elevators and escalators were not observed and do not form part of this report. Merritt & Harris, Inc. reviewed the subconsultant's report and extracted summary information for inclusion within our narratives for the convenience of the reader. The subconsultant's reports are provided in their entirety as attachments to the individual building reports.

On behalf of the Client, Merritt & Harris, Inc. engaged an independent consultant to conduct a **Curtainwall Investigation** at the site in conjunction with the due diligence. The survey was conducted by members of the staff of Heitmann & Associates, Inc. (Heitmann) of New York, New York. The survey included visual observations of the facades from interior spaces, grade level, and roofs of the buildings, and reviews of available documentation pertaining to the exterior wall maintenance and inspection programs. Heitmann personnel did not ride or descend on any scaffolding or rigging to observe the exterior walls. Merritt & Harris, Inc. reviewed the subconsultant's report and extracted summary information for inclusion within our

narratives for the convenience of the reader. The subconsultant's reports are provided in their entirety as attachments to the individual building reports.

The Merritt & Harris, Inc. assignment included a general review of the building's compliance with Title III of the Americans with Disabilities Act (ADA). Items of nonconformance are cited without regard for whether or not they are, by ADA definition, readily achievable. Factors to be considered in determining whether or not an action is readily achievable include the nature and the cost of the action needed, the overall financial resources of the operation, and the number of persons employed at the site. The decision as to which actions are to be undertaken rests, therefore, with the building ownership in consultation with its accountants, lawyers, and architects. Our general observation of the property's ADA status and related comments is not intended, and should not be construed, to replace a full ADA audit and report.

As stated in the Offering Memorandum, "The Port Authority is a municipal corporate instrumentality and political subdivision of the States of New York and New Jersey which provides transportation, terminal, and other facilities of commerce within the Port District. As such, in connection with the Transaction, the PA will continue to maintain exclusive jurisdiction with respect to certain administrative and governmental matters involving the Complex, including compliance with building, environmental, fire and health codes." The New York City Department of Buildings has indicated to our personnel that they do not maintain any records of violations for this property. A request for a Property Profile Overview for this block and lot number yields no records. The Fire Department provides normal fire fighting and a life safety service to the facility. A Memorandum of Understanding exists between the Port Authority and the Fire Department in which the Fire Department performs regular inspections and directly notifies the Port Authority Fire and Life Safety group of deficiencies to be corrected. Under a protocol with the New York City Fire Department, Port Authority Police personnel investigate certain fire alarms at the World Trade Center rather than transmitting such alarms to the New York City Fire Department.

The Merritt & Harris, Inc. report is intended for the use of the General Counsel of the Port Authority.

SECTION IV - EXECUTIVE SUMMARY

Project Scope

Property Components

The subject property consists of a 6-building complex (4 office buildings, a separate government office building, and a hotel) constructed on top of a 2-level retail mall and a 6-level Subgrade development. The Subgrade contains an underground parking garage, loading docks, storage facilities, and central mechanical and electrical services for the overall property. The Hotel, the New York Marriott World Trade Center (3 WTC), and the governmental office building, the Customs House (6 WTC), are not included in the transaction and, therefore, are not included in the scope of the Merritt & Harris, Inc. assignment or this report. The complex is located in the Financial District of downtown Manhattan, New York City and was completed in phases between 1970 and 1977. The following area summary information is taken from the Offering Memorandum and Property Book.

Building	Year Built	Gross Sq. Ft.	Remeasured Sq. Ft.	Rent Roll Sq. Ft.
One	1970	4,761,416	4,468,634	4,358,604
Two	1972	4,761,416	4,470,598	4,173,612
Four	1977	462,738	505,670	470,978
Five	1975	581,238	632,782	612,958
Subtotal Offices		**10,566,808**	**10,077,684**	**9,616,152**
Retail	1970	614,901	440,327	427,448
Total		**11,181,709**	**10,518,011**	**10,043,600**

Common Site Features

The following site features are common to all of the 7 Property Components:

Legal Description

Block 58, Lot 1

Zoning District

C6-4, C5-3

Easements and/or Encroachments

A property survey is reportedly being prepared, but was not yet completed at the time of this assignment. Our investigation of other documentation and interview of various Port Authority personnel during this assignment have yielded certain information about possible easements or encroachments.

The site is shared by 6 buildings and the retail mall. The Marriott Hotel (WTC 3) and the Customs House (WTC 6) are outside the scope of this transaction; however, there are known interconnections of services and access to shared facilities.

Conventional utility company easements are assumed. In addition there are public rights-of-way for the New York City Transit Authority subways and the PATH rail system throughout the complex.

Interconnecting bridges to three adjacent properties (130 Liberty Street, 2 World Financial Center, and 7 WTC) are reportedly the responsibility of the adjacent owners. There are, however, certain physical connections such as foundations, and service connections such as electrical power services that may be subject to easement or covenant agreements.

The WTC complex also includes a remote river water pumping station, west of West Street in Battery Park City. This station is located under the Plaza near the marina at the Hudson River and Liberty Place. The interconnecting river water loop piping runs underground from the pump station, east along Liberty Place, then north along the west side of West Street, and then eastward across West Street entering the complex at 1 WTC. There is also a river water return out-fall which occurs underground behind the sea wall near the adjacent 2 World Financial Center.

Size/Layout

The site is trapezoidal in shape and contains 15.65 acres. The site is bordered by Vesey Street on the north, Church Street on the east, Liberty Street on the south, and West Street on the west. The Marriott Hotel and the Customs House are excluded from the disposition; however, the land leased for those properties is included in the total site area noted.

Topography

The site slopes gradually downward from the east, where the street grade is roughly equal to Plaza Level, towards the west where the street grade is at Concourse level. The constructed Tobin Plaza, in the central area of the site, is accessed by gently sloped ramps up from Church Street, and by exterior stairways and escalators from the other streets.

Flood Plain

The bulk of the site towards the east side is located in Flood Zone C, an area of minimal flooding outside the 500 year flood plain as indicated on the National Flood Insurance Program Flood Insurance Rate Map, Community Panel Number 360497 0054B effective November 16, 1983. Two areas at the midpoint of the north and south boundaries are within Zone B, areas between the limits of the 100-year flood and 500-year flood, and the western edge of the site is within the 100-year flood zone. While the Port Authority does have a basic emergency plan for dealing with flooding on the property, there is no existing control method to prevent catastrophic flooding of the subgrade levels up to level B-2 due to the total flooding of the PATH tubes. Pockets for control doors were built into the perimeter slurry wall, but doors were never installed, as this method of protecting the building would pose a life-safety threat to trains and passengers in the PATH tubes.

Geological Hazards

The site is located in UBC Seismic Zone 2a, an area of minimal seismicity.

Service Utilities

A complete site survey is in the process of being compiled, but was not available at the time of this report. The information contained in this report is based upon a combination of directly observed utilities and information contained in other reports. In this way, the exact number and size of the utility services has not been included.

Electric - Consolidated Edison (New York Power Authority)
Steam - Consolidated Edison
Gas - Consolidated Edison
Water and Sewer - City of New York
Various telecommunications carriers

Underground Irrigation System	None
Access	Pedestrian access is provided at grade on all four bounding streets of the complex and from the central Tobin Plaza. The project also has direct interior access to NYC subway systems (five interior access points to 3 separate subway lines) and the interstate PATH mass-transit systems. Vehicular access for automobiles is limited to pre-screened tenants on a rental basis, to selected Port Authority employees, and to contractors having an agreement with the Port Authority for parking privileges. There are 4 ramps for access to the automobile parking areas; 1 entrance and 1 exit ramp (Ramps B&C) on the north end of the property on West Street, an exit ramp (Ramp D) on the south end of the property on West Street, and an entrance ramp (Ramp H) on the west end of the property on Liberty Street. These ramps are protected by guard station checkpoints and Delta barriers, which are mechanically operated barriers, which swing up out of the pavement to physically block the ramp. Delivery access is by means of a ramp from Barclay Street, one block north. This ramp passes under an adjacent building, 7 WTC. It is protected by a security checkpoint.
Paving	Surrounding streets are paved with asphalt. Parking ramps are concrete.
Sidewalks	The sidewalks surrounding the complex are generally exposed aggregate concrete, with some areas of granite paving that have been installed to accent building entrances.
Curbing	Curbs at the roadways are steel.
Plaza Deck	The Plaza is a granite surfaced reinforced concrete deck with a bituminous waterproof membrane. Areas of the perimeter of the deck, particularly under the building overhangs of 4, 5, and 6 WTC remain the original concrete with exposed aggregate surface. Expansion joints occur at the perimeter of each of the Tower buildings, and along the east side of the Plaza at the high end of the Church Street entry stairway and ramps.
Deck Drainage	The Plaza generally pitches towards the central area near the fountain where the runoff is collected by a circular trench drain surrounding the recessed fountain area.

Landscaping

Sidewalk wells, with cast iron gratings, framed in red granite pavers are provided for street trees along the Liberty, Church and Vesey Street sidewalks. Raised planters with shrubs and annual flowers separate the central stairway from the 2 ramps at the Church Street entrance to Tobin Plaza. All other plantings are contained in monumental sized concrete planters that also serve as security barriers to prevent unauthorized vehicular access. Other street furniture includes concrete benches and concrete and stainless steel security barriers in sculptural shapes.

Site Lighting

City street lighting on perimeter sidewalks, newly installed site lighting from the roof line of 4 and 5 WTC, and pole-mounted, multiple-lamp fixtures on the Plaza.

Fencing

Some rollaway security gates are provided at the base of exterior stairways to prevent unauthorized after-hours entry.

Amenities/Special Features

The major site amenity is the central Austin Tobin Plaza, a public space enclosed by the 6 buildings that make up the complex. The Plaza focuses on a central fountain and sculpture, representing the sun and its outward flowing rays. The Plaza is the focus of formal and informal activity during the warm weather months, when outdoor music, street vendors, and seating for the Plaza Level restaurant tenants all contribute to the life of the space. A smaller "Memorial Fountain" commemorating those who lost their lives in the terrorist bombing, is located at the west side of the Plaza between 1 WTC and the Hotel building. The Plaza is reportedly closed down in the winter months to prevent potential injury to pedestrians by the possibility of ice falling from the Towers.

The asphalt-paved area to the east of the site has recently had benches and planters installed, adding more outdoor seating for public use. A covered performance stage was installed in this area during the past summer for the Plaza's summer music program. A temporary "Green Market" is also one of the seasonal features used to draw street traffic to the site. Some sections of this area have at times been used for special parking requirements.

Signage

There is a polished stainless steel monolith with a bronze plaque and a red numeral designation at the main entrance door for each of the buildings in the complex. Additional exterior signage is building installed.

Mall entrances are marked with back-painted signs on the glass transoms above the entrance doors. Retail tenants with exterior exposure have window-mounted signage. Major commercial office tenants have signage on some of the entrance door transoms. Awnings with Mall signage have recently been installed at Mall entrances.

Ancillary Structures

The river water pump station is located about one block west of the site at Liberty Place and the Hudson River. It is an underground structure beneath the pavement of Battery Park City Plaza. It is included in the Central Plant Report.

There are some minor kiosk installations for bus shelters, street vendors, and taxi cab dispatchers around the site.

Project Condition

The buildings were originally constructed of good quality materials. The overall present condition of the property is good. However, as with any large complex of this age, ongoing repair and maintenance should be expected to be required.

Site

Site improvements are adequate and appropriate for a project of this size and status. The majority of the Plaza, which serves as the roof for the retail mall, was resurfaced in red and gray granite during the Plaza rehabilitation of 1998-99. The fountain was rehabilitated and made fully operational. New benches and planters were installed. The membrane waterproofing beneath the old pavement was probed and found to be functioning well. In general, the concrete sidewalks around the site perimeter are sound without tripping hazards, but there has been spalling and cracking over the years that is beginning to lead to an unattractive appearance. A 1999 study of the sidewalk conditions was performed by M.E.D.D, a unit within the Port Authority Engineering Department. M.E.D.D. included several recommendations for upgrades; however, there has been no decision to proceed with any of the work at this time. Plaza areas outside of the new granite surface have varying degrees of deterioration. However, the repairs have not been implemented pending the coordination of pavement repairs with the possible extension of retail areas under the building overhangs of 4 and 5 WTC. Pavement replacement is in progress along the West Street side of the site adjacent to the Customs House as a separate project under the auspices of the U.S. General Services Administration.

Structural

The building structures appear to be in adequate overall condition. Major structural repairs following the 1993 bomb blast were successfully completed and signed-off by a Permit to Occupy or Use issued by the Port Authority Office of the Chief Engineer on October 10, 1997. The repairs appear to have been properly engineered and executed. Following the bombing incident, stringent security measures were implemented at the vehicular entrances to the Plaza and subgrade facilities.

In the buildings we observed only minor cracking in some slabs, partitions or in stairwells of the buildings. Some minor slab cracks have been noted which should be monitored by the PA's structural consultant. The slabs at the truck dock and delivery area on level B-1 have deteriorated due to ice-melting salts that enter the building on vehicles during the winter. A slab replacement program is ongoing and should be continued until all of the damaged slabs are replaced. The monitoring of the visco-elastic movement dampers in the two Towers is an essential program that has been strongly recommended for continuation by the PA's outside structural consultant. Building movement is monitored by analysis of measurements taken and recorded by devices located in the 108th floor of 1 WTC. Analysis of these records is done by the Port Authority's independent engineer (LERA) and should continue in the future. In addition, physical sampling and analysis of the condition of the visco-elastic dampers is reportedly continuing on a 5-year cycle, with the next sampling to be done in 2001. The slurry wall that surrounds and contains the subgrade levels of the complex has some seepage that is contained by curbing and leaders, and is discharged by sump pumps in the lowest levels.

The slurry wall and the adjacent floor slabs that brace the wall are inspected on an ongoing basis to ensure that unsafe conditions do not develop. Structural Integrity Inspection (SII) Report I-38, dated April 3, 1998, provided in the Data Room, found the conditions to be acceptable. These periodic inspections should continue.

The rating of the structural fireproofing in the Towers and subgrade has been judged to be an adequate 1-hour rating considering the fact that all Tower floors are now sprinklered. An ongoing program of re-fireproofing the structural steel to the full thickness for 2-hour rating is in place. This work is done on a lease rollover basis whenever there is a full floor of space being built out for new occupancy. To date approximately 30 floors have been completed in the two towers. The PA will require this program to continue. The presence of asbestos containing

structural fireproofing is documented and abatement in tenant spaces is being done in conjunction with lease rollovers. Abatement of asbestos containing fireproofing material in elevator shafts is ongoing. Air monitoring and physical inspections are carried out as part of the regular asbestos O&M Plan. Patching of non-asbestos fireproofing is handled through a program of in-house inspection and repair.

Exteriors

Building exteriors are generally functioning adequately. A regular program of inspection is carried on by ABM, the maintenance contractor, and is monitored by a private consultant engaged by the Port Authority. Exterior caulking and repairs are done as required based on the findings of the 2 inspecting agencies. Ongoing repair to the finishes on the 4 and 5 WTC buildings should be expected and, within the 10-year term, it would be advisable to consider a wet-seal and repainting program for those 2 buildings. There have been proposals for refinishing the 2 Tower buildings which, to date have not yet been implemented. This issue will also need to be addressed within the 10-year term. Other exterior conditions, which require ongoing monitoring, and repair as necessary are the exterior marble panels on some of the lower areas of the retail base of the complex and the exterior plaster soffits on the 4 and 5 WTC buildings.

There has been a problem with ice forming on and falling from the Towers during early and late winter months. The problem is most severe when the temperature at the upper Tower levels (which is several degrees colder than at the Plaza Level) falls below freezing. During high humidity days, ice balls can form and dislodge from the wall and roof surfaces. Damage to nearby buildings and injury to pedestrians has occurred. The Port Authority is well aware of this condition and the PA Police Department takes appropriate action to restrict access to sidewalks and the Plaza when the condition occurs. When surrounding streets are involved, the NYC Police are also advised and involved accordingly. There does not appear to be an architectural solution to this problem as it is caused by an unusual atmospheric condition. In addition, there are incidences of noise generated either by the movement of the Tower corner panels or by the movement of underlying back up deck material during high wind conditions when the Tower movement is significant. There are no signs that this movement has caused any damage to the panels or attachments at this time.

Roofs

The roofs of 1 and 2 WTC are the original membrane systems protected by rigid insulation and a 5" thick concrete overlay. These roofs appear to be serving adequately, with only local repairs to the spalled concrete wearing course required over the next 5 years. The roof of 4 WTC is nearing the end of its anticipated service life and replacement should be anticipated. The roof of 5 WTC was replaced in 1991 and may still be under warranty. Requirements for warranty transfer should be investigated. The bituminous membrane under the Plaza deck, which acts as the roof of the retail area, was examined extensively as part of the work done when the Plaza was refinished last year. There are still some chronic leaks at specific locations; such as at the Tower expansion joints and the expansion joint along the Church Street side, but these leaks are corrected as they occur as part of maintenance.

Interiors

Interior conditions are generally good. Full floor office tenants are reportedly responsible for all finishes on their floors. Finishes on the multi-tenant floors will continue to need periodic replacement. Rest room finishes are now about 25 years old and thought should be given to a phased program of modernization on multi-tenant floors. The 20" x 20" ceiling tiles used in some areas are no longer manufactured and the replacement of these ceilings with standard grid ceilings, rather than having custom tiles manufactured, is recommended when replacement or modernization is necessary. Remediation of deficient tenant separation walls and public corridor walls on office floors is being accomplished as new tenant spaces are built-out. While some of these walls do not extend to the underside of the slab, the condition is not deemed to be an immediate problem in this fully sprinklered facility. Vestibule entries for mechanical rooms entered from fire stairs will need to be added in phases.

The Mall spaces are in good condition with various recent build-outs by national retailers. Phased upgrades of Mall common area finishes have also begun, and consideration should be given to continuing the upgrading throughout the rest of the Mall. Monitoring of the Mall ceiling suspension system is done on a regular basis and should continue to be part of the normal maintenance program. Two additional means of egress have been added to the Mall circulation pattern, following a 1992 study by the World Trade and Engineering Departments. Installation of the third additional Mall egress is pending.

Vertical Transportation

The 238 WTC elevators are being maintained under a full-service contract with Ace Elevator. The survey by BOCA Group International, Inc. initially included visual observations of a pre-selected random sampling of 21 elevator and escalator devices at the buildings, and the review of available documentation pertaining to elevator maintenance and modernization programs. The sample elevators selected for observation were chosen to provide a representative specimen from each building and zone and included modernized, partially modernized, and original elevators. Following the initial sampling, BOCA further reviewed and observed additional devices based on callback data provided by the Vertical Transportation Department and on reports prepared by the Port Authority's independent elevator consultant. An evaluation of the maintenance indicates that "maintenance practices range from acceptable to marginally acceptable, with definite room for improvement in the area of housekeeping." In addition the elevator survey reported significant deficiencies that should be addressed under the terms of the full service contract. In general, it was reported that the service contractor is not proactive in addressing problems and that close oversight by the PA Vertical Transportation Department is necessary to maintain acceptable service and maintenance levels.

The modernization of all passenger cabs with new interior finishes, overlay controllers, ADA features, and firemen's recall has recently been completed. The second phase of the modernization program, including switching over from motor generator sets to SCRs, retrofitting door operators, and installing new door-reopening devices, is ongoing (126 completed, 8 in progress) and should be continued to completion (104 not yet modernized). The modernization is resulting in better service and a higher quality ride. When completed, the elevator system can be considered to be equal to those of new Class "A" office buildings. The high-rise shuttle cars in 1 and 2 WTC and the 6 and 7 cars in each Tower are equipped with "elevator followers" which are designed to eliminate rope impact on shaft elements. The venting of elevator shafts in the two towers is through the elevator machine rooms, due to the configuration of elevators over elevators in the central cores. This has been accepted as the only viable solution by the Port Authority as the Code enforcing agent. A test sample of the "Captivate" system, a high resolution monitor carrying news, weather, and internet information within elevator cabs was recently completed. The system is now to be installed throughout the complex.

All escalators have been modernized with start/stop switches, comb plate switches, demarcation lights, caution signs, controlled descent devices, and remote monitoring systems. Carl White devices have thus far been installed on 2 escalator units.

HVAC

The mechanical systems were adequately designed and constructed using brand-name equipment, which provides adequate cooling for the complex. The freeze protection system, recently installed in the 108th floor mechanical equipment room (MER) of 1 WTC, is budgeted to be installed in all the buildings' MERs so that air conditioning will be available throughout the year (especially during normally cooler months when the outdoor temperatures rise higher than normal).

The 2 Towers exhibit a stack effect where there is either high negative or positive pressures that effect the opening and closing of doors and emit loud noise through the elevator shafts. This is particularly noticeable when there are large differences between indoor and outdoor temperatures, especially in the winter and on very humid days. The stack effect will also cause smoke from any subgrade fires to be pulled upward into the building. For this reason, a smoke evacuation system for the PATH station has been designed and budgeted (see Life Safety in this section).

In 1985, Lucius Pitkin Consulting Engineers, an independent consulting firm, was hired to examine the welds on the high-pressure steam pipe risers. The Pitkin Report stated that many welds exhibited flaws, such as insufficient penetration and cracks in circumferential welds. The report recommended that all welds be examined and that any weld lacking 50% or less penetration be removed and repaired. To date this work has not been done, nor have any welds exhibited leaks. Based on the piping system's satisfactory history, we recommend that the program of monitoring the pipe welds be continued and that the leaks be repaired as they occur. We do not find any evidence that warrants any program of system-wide corrective action.

Although in operation, the majority of equipment is past its published service life, and replacement of the equipment should be anticipated. A major capital project to update the air handling systems has effectively increased the service life and reliability of the air handling equipment. Equipment and component replacement is now performed as part of the ABM service contract.

Since its original construction, the central refrigeration plant has been expanded to include an additional 10,000 tons of capacity and improved performance. Full winter operation of the chilled water systems is now possible and redundant river water piping systems allow for improved service and maintenance programs. Both refrigeration plants operate on R-22 refrigerant. The use of Hudson River water for the cooling plant is in compliance with environmental regulations.

Merritt & Harris, Inc. reviewed the findings of a report written by Jaros, Baum, & Bolles (JB&B), Consulting Engineers, New York, New York, dated October 31, 1996. The report was written for the Port Authority and JP Morgan & Co. Inc. It presented an evaluation of the physical condition of the existing Base Building HVAC, electrical, plumbing, and fire protection systems at the WTC. The WTC 1, 2, 4, and 5; the Mall; and the Subgrade were covered in the report. The majority of the JB&B report's findings addressed issues that we consider to fall within the category of normal maintenance. The Port Authority has addressed, or is in the process of addressing and correcting, the issues noted in the JB&B report. Our observations and reviews of documents have confirmed that the issues are being addressed.

Plumbing

The plumbing systems appear to be functioning satisfactorily. Although operational, the majority of plumbing equipment is past its published service life, and replacement of the equipment should be anticipated. Equipment component maintenance and repair is performed as part of the ABM service contract.

Water hammer arrestors, on a 2" water line in a wall on the 55th floor of Tower 1, recently failed flooding the 55th - 44th floors. Samples of the arrestors were sent out for independent evaluation. It was determined that the bellows in the arrestors failed due to repeated expansions and contractions over a 27-year period. Therefore, it is recommended that a program be undertaken to replace all water hammer arrestors in all buildings, before more failures and flooding occur.

Electrical

The electrical systems appear to be functioning satisfactorily, and adequate electrical capacity is provided for all of the buildings. Major upgrades have taken place including feeder and bus duct replacements. The main electric substations are not in compliance with NYC Code and there is no variance in place. The primary issue is the lack of ground fault protection provision before the switchboard. It is understood that the Port Authority approved this configuration, and since the Port Authority is expected to remain the Code interpreter for this installation, new requirements for compliance will not occur in the future. Some of the electrical substations have been modernized as part of a project-wide infrastructure program. In some of the smaller closets, there are clearance issues where new equipment has been installed. These installations are reportedly grandfathered until any new equipment is added and have been accepted by the Port Authority in its role as Code interpretation official. A new standby power plant, located on the roof of 5 WTC and distribution network (beyond that for emergency power), is available for tenant use. It is understood that an operating certification is not required for this installation since it is not intended for use as a co-generation facility.

Life Safety

The life safety systems are appropriate for this type of facility, and have been upgraded during the life of the complex. Currently a new fire alarm system is being installed throughout the facility, and this installation is addressing open issues including return air smoke detection and annunciation, elevator lobby smoke detector activation, public address loudspeakers, and standpipe telephone jacks. The Fire Command stations in each building have been completed and approved. The majority of spaces are sprinklered, except for main lobbies, electrical and mechanical spaces, and some toilet rooms. The sprinklering plan is consistent with the requirements of the New York City Building Code. A survey is required to determine which floors may have inadequate fire hose reach, and to establish a plan to make these floors become code-comforming.

Technically, the stairwells of the Tower buildings should be vented. Because of the height of the stairwells, however the installation of venting fans would not be practical and would, most likely, pull smoke into the stairways from the corridors, a condition that is not favorable. The Port Authority is aware of the lack of venting in the stairwells and, as the code enforcement agency, has accepted that the addition of venting would cause an unsafe emergency exiting situation.

Because of the stack effect, fumes and smoke from fires that may occur in the PATH station can migrate into the Mall area and eventually into the buildings. A plan to install smoke barrier drops at the PATH entrance ceiling and ducted smoke evacuation from the PATH station through the subgrade space have been approved and budgeted. This plan appears to be a sound one. We are informed that this work will begin shortly.

An egress study has been made which recommended that 3 additional means of egress be constructed in the Mall. Two exits were added and a third, exiting from the vicinity of the present Godiva Chocolatier shop, is planned and budgeted.

Energy Conservation

The buildings have a mix of clear single-pane glazing or tinted single-pane glazing. There is no energy management system, although the central plant control system can be used to check trends and manually optimize the equipment operation. It is of note that electrical power is provided by Consolidated Edison, but purchased directly from the New York Power Authority at a relatively low cost.

Maintenance

Electrical, HVAC and general maintenance is performed under the terms of a consolidated performance-based service contract by ABM Engineering, with oversight by the Port Authority World Trade Department's Building Services Management Division. In general, maintenance of the systems appears to be adequate. Housekeeping (cleaning) deficiencies were noted in stairwells, electrical closets, and service areas. Ongoing repairs and replacement of components were observed to be in progress in various areas. It should be noted that the ABM Engineering contract calls for both the maintenance and repair of equipment. If a new contract is entered into with a service company for maintenance only, the replacement of equipment must be accounted for separately.

ADA Accessibility

The office building entrances, travel routes, and elevators are ADA compliant. ADA compliance on most full tenant floors is reportedly the responsibility of the tenants under terms of the leases (Merritt & Harris, Inc. did not review the leases), which would be a common practice. ADA compliance for toilet rooms on multi-tenant floors is a building owner's responsibility. Upgrades to toilet rooms, signage, and door hardware for building common spaces should be made on multiple-tenant floors.

The Mall has ADA-accessible entrances on grade in numerous clearly marked locations. All ADA entrances have power-assist doors. Although the 2 Mall levels are individually accessible, interior interconnection between the Concourse and the Plaza Levels is available only by ramp and elevator in the 5 WTC building, the office building elevators in 4 WTC, and a private tenant elevator in the Border's Store. We recommend that the redevelopment of the vacant retail space in the southeast section (4 WTC area) include consideration for a public elevator in the Mall common area to streamline ADA access between levels. Public rest rooms in the Mall are accessible as defined by the ADA.

Violation Status

As stated in the Offering Memorandum, "The Port Authority is a municipal corporate instrumentality and political subdivision of the States of New York and New Jersey which provides transportation, terminal, and other facilities of commerce within the Port District. As such, in connection with the Transaction, the PA will continue to maintain exclusive jurisdiction with respect to certain administrative and governmental matters involving the Complex, including compliance with building, environmental, fire and health codes." The New York City Department of Buildings has indicated that they do not maintain any records of violations for this property. A request for a Property Profile Overview for this block and lot number yields no records. The Fire Department provides normal fire fighting and a life safety service to the facility. A Memorandum of Understanding exists between the Port Authority and the Fire Department in which the Fire Department performs regular inspections and directly notifies the Port Authority Fire and Life Safety group of deficiencies to be corrected. Under a protocol with the New York City Fire Department, Port Authority Police personnel investigate certain fire alarms at the World Trade Center rather than transmitting such alarms to the New York City Fire Department.

Environmental Site Assessment

During construction, essentially all soil down to 75' was removed, eliminating any potential pollution from previous uses of the site. R.W. Crandlemere & Associates identified other locations of recognized environmental conditions in the search radius, but concludes that none of these sites or the current use of the WTC, are likely to impact the environmental integrity of the subject site.

The use of Hudson River water for the cooling plant is in compliance with regulations. The current NYDEC State Pollutant Discharge Elimination System (SPDES) permit extends to May 1, 2004. Monitoring reports and SPDES inspections performed in 1999 and 2000 state, "no reported permit limit exceedences."

The 1999 Denny & Associates report concerning the broadcasting and transmission devices mounted on the roof of WTC1 were reviewed. Operational guidelines are currently in place to provide protection to trained workers and escorted visitors. Based on the Denny & Associates report, R.W. Crandlemere & Associates recommends further additional investigation concerning radio frequency exposure levels for visitors to the observation deck on 2 WTC.

The R.W. Crandlemere & Associates *Environmental Site Assessment* is included in its entirety in this report.

Asbestos

Asbestos-containing materials (ACM) were used as sprayed-on fireproofing and pipe insulation during the original construction. Vinyl-asbestos tile is present throughout the complex. The Port Authority has identified the areas having ACM, which are primarily tenant spaces, mechanical rooms, subgrade areas, and elevator shafts. A large portion of the ACM has been removed and the abatement process is continuing as tenant leases rollover and the spaces are retrofitted. Some abatement projects are carried in the capital budgets for 2001-2005 and other VAT and spray-on abatement work is treated as an operating cost. An Operations and Maintenance Plan has been produced and specific staff personnel have been trained and certified as ACM handlers to deal with incidental disturbance of the material. Much of the ACM in the pipe insulation in the subgrade areas has been removed. Tenants occupying floors that may still contain asbestos material have been formally notified.

There is a reported litigation in process for cost recovery related to ACM abatement. This litigation was not reviewed as part of this report and questions pertaining to the subject should be addressed to the appropriate legal entity.

R.W. Crandlemere & Associates reports addressing the presence of ACM are provided in each individual building section of this report.

Specific Recommendations

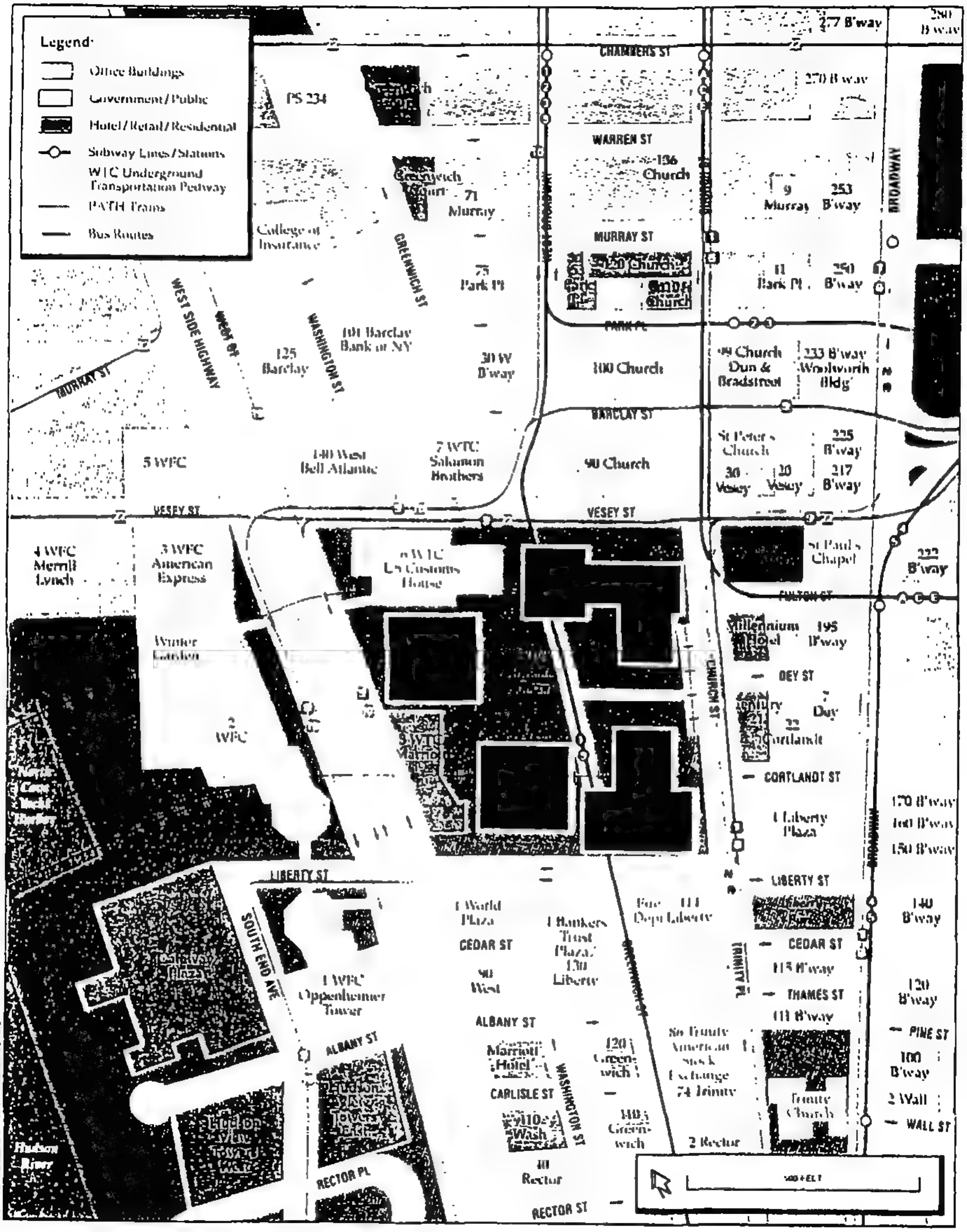
Specific recommendations, items of concern, and building deficiencies are noted in "E. Recommendations" section of the individual property component reports. Priorities are divided into Immediate (0-1 Year), Future (1-5 Years) and Future (6-10 Years) categories.

EXECUTIVE SUMMARY ATTACHMENTS

1. Neighborhood Map (Reproduced with permission from J.P. Morgan Property Book)
2. Résumés of participating Merritt & Harris, Inc. staff personnel
3. Due Diligence Check List of Documents as of October 31, 2000
4. WTC - Proposed 2001 Capital Plan
5. WTC - Proposed 2002-2005 Capital Plan
6. R.W. Crandlemere & Associates Environmental Site Assessment Phase I Report (separate binder)
7. BOCA Group International, Inc. - Overall Observation

ATTACHMENT 1

Neighborhood Map
(Reproduced with permission from J.P. Morgan Property Book)


Legend
Office Buildings
Government/Public
Hotel/Retail/Residential
Subway Lines/Stations
WTC Underground Transportation Pathway
PATH Trains
Bus Routes
CHAMBERS ST
WARREN ST
MURRAY ST
PARK PL
BARCLAY ST
VESEY ST
FULTON ST
DEY ST
CORTLANDT ST
LIBERTY ST
CEDAR ST
THAMES ST
PINE ST
WALL ST
ALBANY ST
CARLISLE ST
RECTOR ST
RECTOR PL
BROADWAY
CHURCH ST
GREENWICH ST
WASHINGTON ST
WEST SIDE HIGHWAY
WEST ST
SOUTH END AVE
TRINITY PL
MURRAY ST
277 B'way
270 B'way
PS 234
136 Church
9 Murray
253 B'way
71 Murray
College of Insurance
75 Park Pl
11 Park Pl
250 B'way
101 Barclay Bank of NY
125 Barclay
30 W B'way
100 Church
99 Church Dun & Bradstreet
233 B'way Woolworth Bldg
St Peter's Church
225 B'way
30 Vesey
20 Vesey
217 B'way
5 WFC
140 West Bell Atlantic
7 WTC Salomon Brothers
90 Church
4 WFC Merrill Lynch
3 WFC American Express
6 WTC US Customs House
St Paul's Chapel
222 B'way
Millennium Hotel
195 B'way
Winter Garden
2 WFC
7 Dey
22 Cortlandt
1 Liberty Plaza
170 B'way
160 B'way
150 B'way
1 World Plaza
1 Bankers Trust Plaza/ 130 Liberty
140 B'way
115 B'way
120 B'way
111 B'way
90 West
1 WFC Oppenheimer Tower
100 B'way
2 Wall
Marriott Hotel
120 Greenwich
140 Greenwich
86 Trinity American Stock Exchange 74 Trinity
Trinity Church
2 Rector
40 Rector
Hudson River

ATTACHMENT 2

Resumes of participating Merritt & Harris, Inc. staff personnel

THOMAS C. RICHARD, AIA

President & Chief Executive Officer

ACCREDITATION	Registered Architect in the State of New Jersey
PROFESSIONAL AFFILIATIONS	New Jersey Society of Architects Architects League of Northern New Jersey American Institute of Architects (AIA) American Society for Testing and Materials (ASTM) Mortgage Bankers Association - New York Urban Land Institute
EDUCATION	Bachelor of Arts, Fordham University School of Architecture, Pratt Institute
MERRITT & HARRIS, INC. *New York, NY*	Mr. Richard joined the consulting firm in 1981 as a Project Manager and was appointed Vice President in 1984. In 1987 he was named Senior Vice President & Principal heading the Due Diligence Division, which provides total building evaluation services to the real estate financing and investment community. In 1996, Mr. Richard became President & CEO of Merritt & Harris, Inc.
HARSEN & JOHN PARTNERSHIP ARCHITECTS *Tenafly, NJ*	Employed as a Senior Project Supervisor, Mr. Richard worked for the architectural firm from 1969 through 1976. His responsibilities included design and construction supervision of multi-million dollar educational, municipal, and multi-family housing projects. Mr. Richard rejoined the partnership in 1978 as the Director of Operations, with supervisory control of design, document production, construction, and administrative functions of that forty person office, and organized a subsidiary architectural interiors company.
G&R SERVICES *Bogota, NJ*	From 1976 to 1978 Mr. Richard was a partner of a design/build construction company. His duties included administration, construction supervision, design, and estimating. He served as on-site Educational Facilities Design Consultant to the Federal Republic of Nigeria for the design of the National Educational Technology Center in Kaduna, Nigeria.

ROBERT G. WEILAND, R.A.

Principal - Due Diligence

ACCREDITATION	Registered Architect in the State of New York
EDUCATION	Bachelor of Architecture, Pennsylvania State University Graduate Study - Architectural Technology, Columbia University
MERRITT & HARRIS, INC. *New York, NY*	Mr. Weiland joined the consulting firm in 1984 as a Project Manager and evaluated various projects throughout the United States. His responsibilities include review of construction drawings and specifications, and field observation of new and existing construction. Appointed Vice President in 1988, he assumed the responsibilities of coordinating nationwide, multi-site portfolio observations, and developing formats for the presentation of real estate tax appeal projects for municipal government clients. In 1996, Mr. Weiland was appointed a Principal of Merritt & Harris, Inc.
Major Projects	Chrysler Building - New York, NY Macy's Portfolio - Various Nationwide Locations IBM Tower - Atlanta, GA Rockefeller Center - New York, NY Alamoana Shopping Center - Honolulu, HI
IFFLAND, KAVANAGH, WATERBURY, PC *New York, NY*	An Associate of the firm, Mr. Weiland was responsible for industrial, commercial, and television broadcast projects, from initial client contact through program development. His duties also included the production of construction drawings and specifications, and supervision of construction. He was an employee of the firm from 1978 to 1984.
MARINE MIDLAND BANK *New York, NY*	Mr. Weiland worked for the bank as an Architectural Designer in the facilities management department from 1974 to 1978. His job responsibilities entailed client contact for program development and preliminary design, as well as construction document preparation and field supervision for the construction of corporate office facilities and branch banks.
URS/MADIGAN - PRAEGER *New York, NY*	As a Project Architect in 1973, Mr. Weiland prepared construction documents and made field inspections for renovation projects including, municipal garages, stadiums, and waterfront facilities.

JACK M. KAGAN

Principal - Mechanical/Electrical Engineer

ACCREDITATION	Certified, National Board of Boiler and Pressure Vessel Inspectors Certificate of Competency, State of New York Department of Labor, Bureau of Boilers
PROFESSIONAL AFFILIATION	American Society of Mechanical Engineers
EDUCATION	Associates Degree in Applied Science - Mechanical Technology, New York City Community College Bachelor of Mechanical Engineering Degree, Pratt Institute
MERRITT & HARRIS, INC. *New York, NY*	Mr. Kagan joined the consulting firm in 1984 as a Mechanical Maintenance Equipment Specialist. His responsibilities included design review of mechanical, plumbing, electrical plans and specifications, and field evaluation of new and existing construction. In 1988 Mr. Kagan was named Assistant Vice President-Electro/Mechanical Engineer. Mr. Kagan was appointed a Principal of Merritt & Harris, Inc. in 1996.
Major Projects	Ice Palace - Tampa, FL Chrysler / Kent Buildings - New York, NY Las Colinas Office Buildings - Dallas, TX The Waikaloa Resort - Honolulu, HI Greenway Office Towers - Houston, TX
ROYAL INSURANCE CO. *New York, NY*	As a member of the Boiler and Machinery Department from 1981 to 1984, Mr. Kagan was responsible for the technical support of sixty-five field offices and home office departments, for all phases of boiler and machinery equipment insurance.
HEMPSTEAD RESOURCES RECOVERY *Garden City, NY*	Mr. Kagan worked as a process supervisor from 1978 to 1980 and was responsible for the processing of two thousand tons of municipal garbage per day for metals recovery and fuel production for a 40 MW electric generating station.
E.I. DUPONT *Newark, NJ*	Serving as a mechanical supervisor in the Engineering Department, Mr. Kagan was responsible for project engineering, minor construction, and powerhouse and waste treatment operations. He also served as Production Supervisor in the Organic Color Pigments Finishing Department. Mr. Kagan worked at E.I. DuPont from 1974 to 1978.

PETER J. BRADY, P.E.

Project Manager -Due Diligence

ACCREDITATION	Professional Engineer in New York State
EDUCATION	Bachelor of Civil Engineering, City College, City University of NY Master of Civil Engineering, City College, City University of NY
MERRITT & HARRIS, INC. *New York, NY*	Mr. Brady joined the consulting firm in 1994 as a Project Manager for the evaluation of various projects throughout the United States. His responsibilities include the review of construction drawings and specifications, and field observation of new and existing construction.
Major Projects	DisneyWorld Swan & Dolphin Hotels - Orlando, FL Hato Rey Tower - San Juan, Puerto Rico Ritz Carlton - Naples, FL West Port Plaza - St. Louis, MO Wolfchase Galleria - Memphis, TN
DEPARTMENT OF HOUSING PRESERVATION & DEVELOPMENT *New York, NY*	Mr. Brady was hired in 1960 as an Assistant Civil Engineer. His responsibilities included being a field engineer for all phases of hi-rise residential construction. Promoted to Civil Engineer in 1964, his new responsibilities included the review of hi-rise plans and specifications for code compliance, coordination, and completeness. As a Senior Civil Engineer, Mr. Brady supervised engineers on review and coordination of plans and specifications. In 1972 Mr. Brady was promoted to Chief of Engineering and Construction for the New York HPD's Middle Income Housing Program. During the 1980s he directed the HPD's conversion from new construction to substantial and moderate rehabilitation. He developed procedures and forms for recording and evaluating the condition of vacant/vandalized buildings. Mr. Brady also prepared construction standards for compliance with various loan program requirements, and developed parameter cost estimating procedures using personal computers and spreadsheet packages.

JOSEPH J. MARCIANO, P.E.

Mechanical/Electrical Engineer

ACCREDITATION	Licensed Professional Engineer in the State of New York
PROFESSIONAL AFFILIATION	Member, American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE)
EDUCATION	Bachelor of Science, Cornell University Construction Management Diploma - The Real Estate Institute at NYU
MERRITT & HARRIS, INC. *New York, NY*	Mr. Marciano joined the firm as a Mechanical Engineer in 1996. His job responsibilities include design review services for adequacy and completeness of mechanical and electrical systems for new construction and renovation work. Mr. Marciano's due diligence work includes detailed reviews of the HVAC, plumbing, electrical, life safety, and energy conservation systems of existing buildings.
Major Projects	Warner Theater Building - Washington, DC Blanchard Plaza - Seattle, WA Greenwich Office Park - Greenwich, CT Reston Town Center - Reston, VA West Port Plaza - St. Louis, MO
COMPREHENSIVE DEVELOPMENT CORPORATION *New Rochelle, NY*	As a Construction Consultant from 1991 through 1996, Mr. Marciano provided estimating, scheduling, and claim servicing, as a well as site evaluations, and plan review and coordination. His various responsibilities, included coordinating the mechanical, electrical, and plumbing work at two primary schools for the New York City School Construction Authority. Mr. Marciano also coordinated the contractors in the field, maintained the project records and interfaced with the designers and the client.
NASCO ASSOCIATES *New York, NY*	Mr. Marciano served as a Project Manager and Senior Estimator for this construction management and consulting firm. He specialized in field coordinating and project cost estimating during all stages of design, from conceptual to final, including change order evaluation. Other duties included scheduling, inspecting, handling contractor claims and performing value engineering studies. Mr. Marciano also served as an engineering audit officer on the Stuyvesant High School project in Battery Park City. Mr. Marciano worked for Nasco Associates from 1987 to 1991.

ATTACHMENT 3

Due Diligence Check List of Documents

WORLD TRADE CENTER
DATA CENTER
DUE DILIGENCE CHECKLIST
(As of October 31, 2000)

ITEM		
A	GENERAL PROPERTY INFORMATION	
	1	Offering Memorandum (x2)
	2	Property Book (x2)
B	LEASING INFORMATION	
	1	Argus Rent Roll as of 10/1/00
	2	Port Authority's Rent Roll
	3	WTC Fixed Billing System as of 11/1/00
	4	Leasing Activity Reports
		a. June-Current 2000
	4	Retail Sales Reports
		a. 1998 & 1999
		b Year to Date 2000
		c Total Sales by Store - First Six Months (2000 vs. 1999)
	5	Port Authority ("PA") Comptroller's Suffix Descriptions for WTC Fixed Rent Roll
	6	Copies of Retail, Office and Subgrade Leases and Lease Abstracts
		a. Office Tenants
		b Retail Tenants
		c Subgrade Tenants
		d Telecommunication/Broadcasting Tenants
	7	Leases Under Negotiation and Expected Terms for 2000

8	PA Comptroller's List of WTC Percentage Agreement Tenants	
9	Telecommunication/Broadcasting Agreements	
	a.	Summary of deals
10	Copies of Existing Ground Leases	
	a.	Marriott Hotel
		i Privilege Permit dated as of 1/1/98 to HMH WTC, Inc.
	b	Customs House
11	Remeasurement Study	
C	FINANCIAL INFORMATION	
1	WTC Allocation Methodology Summary of Financial Statements included in the Offering Memorandum	
2	2000 PA Operating Forecast	
3	Historical Operating Statements [1997-1999]	
4	Payroll	
5	Real Estate Taxes	
	a.	Current Assessed Valuation for Block 58, Lot 1
	b	Agreement between the PA and the City of New York, dated as of 1967 regarding Payments in Lieu of Taxes ("PILOT")
	c	1999/00 letter to New York City ("NYC") Explaining PILOT Calculation
6	Agreement between the PA and The Alliance For Downtown New York, Inc., with respect to BID Payments	
	a.	February 9, 1995 Agreement
	b	December 24, 1998 Amendment
7	Capital Expenditures	
	a.	Updated Capital Plan
8	Miscellaneous	

ITEM	
	a. 10/1/00 Rental Receivables Reports
D	ENVIRONMENTAL INFORMATION
1	Summary of Environmental and Asbestos Due Diligence
2	Asbestos Records, including a disclosure memo, identifying known locations of asbestos-containing materials; abatement project files; quantities removed; and estimates of remaining quantities
3	Known Location of Asbestos
4	NYS DEC State Pollutant Discharge Elimination System (SPDES) Discharge Permit, dated 4/12/99
5	Annual Regulatory Permits/Licenses, including Petroleum and Chemical Bulk Storage
	a NYS DEC Petroleum Bulk Storage Registration Certificate, issued 8/4/98
6	Hazardous Materials Response Plans, inventories and certificates
7	Hazardous Waste Manangement records and inspections
8	Annual U.S. Environmental Protection Agency SARA Title III Community-Right-To-Know Inspection Reports-Tier II
9	Annual New York State Department of Environmental Conservation Annual Environmental Audit and Toxic Release Inventory
10	Evaluation of Radio Frequency Environment at the WTC-North Tower (Richard Tell 9/97)
11	RE-Evaluation of Radio Frequency Environment at the WTC-North Tower (Supplemented 9/5/99, revised 3/21/00)
12	Denny & Associates: Electromagnetic field strength survey - South Tower (1/99)
13	Investigation of RF Safety Cosiderations on the WTC Antenna Mast (Richard Tell 5/12/00)
14	Condenser, Hot & Chilled Water Report as of 9/30/00
15	United States of America Federal Communications Commission Antenna Structure Registration, issued 3/23/98

ITEM	
E	OPERATING AND MAINTENANCE MANUALS
1	River Water Pump Station - Vol. 1
2	Remote Lighting Control System - Vol. 2
3	Chiller Plant Addition B6 Refrigeration Plant - Black Binder
4	Mechanical System: Central Refrigeration Plant - Vol. 3
5	Mechanical System: Central Refrigeration Plant (2500 ton chillers) - Vol. 3A
6	Electrical System: Central Refrigeration Plant - Vol. 4
7	Electrical System: Central Refrigeration Plant (2500 ton chillers) - Vol. 4A
8	High Voltage Distribution System - Vol. 5
9	Low Voltage Distribution System, Towers A & B - Vol. 6
10	Emergency Power Distribution System - Vol. 8
11	Plaza Sculpture Fountain System - Vol. 9
12	Low Voltage Distribution System, NEPB & SEPB - Vol. 10
13	Low Voltage Distribution System, Subgrade Levels - Vol. 11
14	Smoke Detection System-Observation Deck, Tower B - Vol. 12
15	Domestic Water System: Tower A & B - Vol. 14
16	HVAC System Tower A & B - Vol. 15
17	Elevator System - Vol. 20
18	Antenna Heating System - Tower A - Vol. 21
19	Fire Protection System - Vol. 23
20	Sewage & Sump System Sublevels Tower A & B - Vol. 25
21	Window Washer & Exterior Platform Equipment Towers A & B - Vol. 31
22	Window Washing & Exterior Wall Maintenance Systems SEPB & NEPB - Vol. 32

ITEM			
	23		Computer Cooling Water System - Towers A & B - Vol. 33
	24		Computer Cooling Water System - NEPB & SEPB - Vol. 34
F	PERFORMANCE INDICATORS		
	1		Fourth Quarter '99, First & Second Quarter '00
G	CAPITAL EXPENDITURE CONTRACTS		
	1		Memorandum summarizing Elevator Modernization Programs
H	SERVICE CONTRACTS		
	1		Contract WTC-799.700: Amendment No.1 to Agreement to Perform Maintenance of Elevators, Dumbwaiters & Escalators: 1,2,4,& 5 WTC (3/18/99)
	2	a	Contract WTC-891.073: Furnish, Install and Configure Office Space Security System Software at the World Trade Center
		b	Contract WTC-799.610: Maintenance of Office Space Security System Software at the WTC (5/94)
	3		Contract WTC 845.071: Modernization of Elevators, Dumbwaiters and Escalators: 1 WTC (3/94)
	4		Contract WTC 838.071: Modernization of Elevators and Escalators- 4 & 5 WTC (9/93)
	5		Contract WTC 846.071: Modernization of Elevators and Escalators 2 WTC (3/94)
	6		WTC Agreement No. 990102: Provision of Construction Management Services on a "Call-In" Basis
	7		TDI Advertising Contract (The Mall)
	8		Contract WTC 799.60: Ironbound Flooring Installation
	9		Contract WTC 891.074: Purchase of Key & Lock Cylinder System (office space security system hardware)
	10		Contract WTC 799.47A: Maintenance Painting via Work Order 1, 2, 4 & 5 WTC
	11		Contract WTC 822.071: Emergency Power For Condenser Water System No. 1

ITEM	
12	Fire Alarm Maintenance Replacement Parts & Technical Services (Req. #52618)
13	Contract WTC 799.39: Maintenance of Centrifugal Refrigeration Machines with Supplemental Agreement and Extension
14	Contract WTC 799.710: Agreement to Perform Consolidated Electrical, Mechanical & General Maintenance Services
15	Contract WTC 799.688: Provide Maintenance of Six (6) Diesel Generators
16	Exercise of Option Period Agreement with Grand Central Neighborhood Social Services Corp. to Provide Labor for the Collection and Sorting of Recyclable Paper
17	Contract PSE - 727: Refinishing & Restoration Services of the Stainless Steel Surfaces – Concourse, Skylobby Levels of 1, 2, 4 & 5 WTC
18	Contract PSE - 801: Restoration of Stainless Steel & Other Metal Surfaces
19	Cleaning & Cleaning Related Services – Request for Proposals
20	Contract PSE - 864: Collection of Recyclable Waste Paper – Agreement with Manhattan Bowery Management Corp., NY
21	Contract PSE - 634: Trash Removal & Recycling Service at the WTC
22	Contract PSE - 821: Refuse Removal, Recycling & Disposal
23	Contract PSE - 821: Refuse Removal, Recycling & Disposal at WTC for 2 years
24	Contract PSE - 850: Removal of Construction Debris from the WTC
25	Contract WTC-463.00: Removal of Construction Rubbish, dated June 1995
	a Assignment and Assumption with Consent of Contract WTC-463.00: Removal of Construction Rubbish, dated October 1996
26	Contract WTC-697.00: Construction Labor Services
	a Amendment Number One to Contract WTC 697.00: Construction Labor Services
27	Contract WTC-457.03: Design Build Services for 1, 2 & 3 WTC

ITEM		
	28	Maintenance of Office Space Security System Software
	29	Contract WTC 799.56A: Agreement to Provide Fire Safety Director Service-1,2,4 & 5 WTC
	30	Design/Build Services for Tenants
	31	Contract WTC 799.690: Fire Alarm System Service Agreement for the World Trade Center Complex
	32	Contract WTC 115.300: Removal and Disposal of Vinyl Asbestos Floor Tiles and Other Asbestos-Containing Material Via Work Order (11/99)
	33	Contract WTC 881.072: Rehabilitation of B-1 Level (Truck Dock) Floor Slab (9/99)
I	STRUCTURAL INTEGRITY INSPECTION REPORTS by LESLIE E. ROBERTSON	
	1	Concourse, Subgrade, Marriott Back of House, 4 & 5 WTC Space Usage (11/20/98)
	2	Concourse, Subgrade, Marriott Back of House, 4 & 5 WTC Space Usage (12/24/97)
	3	River Water Pump Station (9/22/98)
	4	River Water Pump Station (4/28/95)
	5	Concourse Plaster Ceilings (9/18/98)
	6	Accessible Columns - 4 & 5 WTC (8/19/98)
	7	Elevator Pits & Machine Rooms - 1, 2, 4 & 5 WTC (10/30/99)
	8	Elevator Pits & Machine Rooms - 1, 2, 4 & 5 WTC (7/20/98)
	9	Elevator Pits & Machine Rooms - 1, 2, 4 & 5 WTC (12/18/97)
	10	Exterior Plaster Soffits - 4 & 5 WTC (7/20/00)
	11	Exterior Plaster Soffits - 4 & 5 WTC (7/15/98)
	12	Exterior Plaster Soffits - 4 & 5 WTC (8/31/96)
	13	Space Usage Survey - 1 & 2 WTC (6/15/98)
	14	Space Usage Survey - 1 & 2 WTC (7/31/97)

ITEM	
15	Space Usage Survey - 1 & 2 WTC (9/20/96)
16	Space Usage Survey - 1 & 2 WTC (9/20/96)
17	Slurry Walls & Adjacent Slabs - 1 & 2 WTC (6/98)
18	Slurry Walls & Adjacent Slabs - 1 & 2 WTC (5/28/97)
19	Slurry Walls & Adjacent Slabs - 1 & 2 WTC (7/16/96)
20	Accessible Columns - 1 & 2 WTC (5/30/98)
21	Accessible Columns - 1 & 2 WTC (5/23/97)
22	Accessible Columns - 1 & 2 WTC (5/1/96)
23	Floor framing - 4&5 WTC (7/24/98)
24	Plaza Level Box Columns (5/8/98)
25	Lobby Ceilings - 1 & 2 WTC (5/1/98)
26	Lobby Ceilings - 1 & 2 WTC (6/30/97)
27	Accessible Columns - 4 & 5 WTC (1/26/98)
28	Marble Panel Wall Inspection - 3, 4, 5 & Concourse Level at WTC (1/15/98)
29	Marble Panel Wall Inspection - 3, 4, 5 & Concourse Level at WTC (10/1/97)
30	Concourse Ceilings (5/23/00)
31	Concourse Ceilings (1/7/98)
32	Television Mast - 1 WTC (1/7/98)
33	Television Mast - 1 WTC (8/14/95)
34	Floor Frequency Measurements - 1 & 2 WTC (4/20/95)
35	Fire Stairs - 1 & 2 WTC (4/28/95)
36	Accessible Columns - 4 & 5 WTC (4/28/95)
37	Accessible Columns - 1 & 2 WTC (4/14/95)
38	Natural Frequency Measurements - 1 & 2 WTC (4/12/95)
39	Slurry Walls & Slabs at Slurry Walls (4/3/95)

ITEM	
40	Slabs, Partitions, Finishes and Floor Framing - 1 & 2 WTC (4/1/95)
41	Marble Panels - 1 & 2 WTC (3/13/95)
42	Marble Panels - 1 & 2 WTC (10/1/97)
43	Marble Panels - 1 & 2 WTC (8/30/99)
44	Bracing of 1 & 2 WTC below Elev. 294' – 0" (3/1/95)
45	Marble Panels - 3, 4, 5 & 6 WTC & Concourse Level (2/22/95)
46	Hat Truss between Floor 107 & the Roof (2/21/95)
47	Lobby Ceilings (1/17/95)
48	Crown Framing Deterioration - 1 & 2 WTC (11/16/94)
49	Exterior Plaster Soffits - 4, 5 & 6 WTC (11/21/97)
50	Exterior Plaster Soffits - 4, 5 & 6 WTC (5/28/92)
51	Concourse Plaster Ceilings - 4 & 5 WTC (5/1/91)
52	Damper Testing - 1&2 WTC (5/28/96)
53	Subgrade levels - WTC Facility Condition Survey Report (3/96)
54	Floor Slabs, Partitions, Column Finishes - 1&2 WTC (12/10/97)
55	Mechanical Equipment Rooms - 1&2 WTC (5/99)
56	Mechanical Equipment Rooms - 1&2 WTC (4/12/96)
57	B5 & B6 Passageway & Storage Area -WTC Subgrade (8/12/97)
58	Concrete Slabs, Partitions Column Finishes & Floor Framing over Tenant Spaces -1&2 WTC (6/28/96)
59	WTC Spray Fire Protection Tower Spandrels & Diagonals (10/1/96)
60	Tower Subgrade Levels WTC Facility Condition Survey Report (3/96)
61	WTC River Pump Station, U.S. Customs House Soffit, Plaza Level Slab & Concourse Level Ceiling Facility Condition Survey Reports (6/96)
62	Northeast & Southeast Plaza Buildings Facility Condition Survey Report(11/95)

ITEM		DESCRIPTION
	63	Northeast & Southeast Plaza Buildings Facility Condition Survey Report (9/94)
	64	Report on WTC Sidewalks (MEDD Architects 7/2 7/99)
	65	WTC Subgrade Parking Garage Slabs (1/00)
	66	1,2,4 & 5 WTC, Floor Framing (11/29/99)
	67	4 & 5 WTC, Mechanical Equipment Rooms (10/99)
	68	1 WTC, Pedestrian Access Bridges (9/28/99)
	69	4 & 5 WTC, Cantilever Trusses & Exterior Plaster Soffits (9/99)
	70	1 & 2 WTC, Floor Framing Inspection, Action Memo 1 (8/23/99) & Action Memo 2 (9/8/99)
	71	4 & 5 WTC, Floor Framing - Action Memo 1 (8/10/99)
	72	6 WTC Exterior Plaster Soffits (7/16/99)
	73	1 WTC, Natural Frequency Measurements (7/11/00)
	74	1 & 2 WTC, Crown Framing (6/30/99)
J		**FACADES**
	1	Curtainwall - 1&2 WTC (Facades)
	2	Curtainwall and Roof Inspection - 1&2 WTC (10/29/99)
	3	Curtainwall - 4&5 WTC (Facades)
	4	Curtainwall and Roof Inspection - 4&5 WTC (4/28/95)
	5	Curtainwall and Roof Inspection - 4&5 WTC (10/9/98)
	6	1996 Structural Integrity Inspections - 1&2 WTC Facades
	7	1997 Structural Integrity Inspections - 1&2 WTC Facades
	8	1998 Structural Integrity Inspections - 1&2 WTC Facades
	9	Curtainwall reinspection 10% (10/29/99)
K		**MECHANICAL REPORTS/INFORMATION**
	1	Maintenance Management Evaluation (6/99)
	2	Steam trap evaluation report (8/6/99)

ITEM		
3	Lucius Pitkin's Eddy Current Survey	
	a.	York Centrifugal Unit 2 (6/22/98)
	b	York Centrifugal Unit 3 (6/22/98)
	c	York Centrifugal Unit 5 (6/22/98)
	d	York Centrifugal Unit 6 (6/22/98)
	e	York Centrifugal Unit 1, 4 & 7-condensers and York Centrifugal Units 2, 3, 4-chillers (6/30/99)
	f	York Centrifugal Units 8, 9, 10, 11 & 12-condensers (7/21/99)
5	Summary memo of WTC River Water Lines (9/6/00)	
6	WTC 1,2,4,5 & Subgrade Air Handling Unit Rehabiliation (set of drawings) (5/13/98)	
L	VERTICAL TRANSPORTATION PROFILE & INSPECTION REPORTS	
1	Elevators	
	a.	1 WTC (Cars 1-99)
	b	2 WTC (Cars 1-99)
	c	4 WTC (Cars 1-12)
	d	5 WTC (Cars 1-9)
	e	Subgrade Cars-1WTC (P1, J1-J4)
	f	Subgrade Cars-2WTC (K1-K5)
	g	4WTC (FE1-FE4)
2	Escalators	
	a.	1 WTC: A1-A8
	b	2 WTC: B1 - B14
	c	S.E. Plaza (E14-E15)
	d	N.E. Plaza (E1-E13)
	e	PATH Escalators: P1-P11; P24; P27-P29
	f	Mall Escalators: E1, E2, E11-15, E17

ITEM		
3	Controller Manual s & Prints for Modernized Elevator Cars	
	a	ACE Elevator Co. CEC Futura Manual PA Contract #WTC 838.071, SEP Bldg. 4 Cars 1-6
	b	ACE Elevator Co. CEC Futura Manual Contract #WTC 838.071, SEP Bldg. 4 Cars 7-12
	c	ACE Elevator Co. CEC Futura Manual Contract #WTC 838.071, SEP Bldg. 5 Cars 1-6
	d	ACE Elevator Co. CEC Futura Manual & Diagram for Cars 12B, 13B PA Contract #WTC 846.071
	e	ACE Elevator Co. CEC Futura Manual Contract #WTC 845.071 SEP Bldg. 1 Cars 24A-29A
	f	ACE Elevator Co. CEC Futura Manual PA Contract #WTC 845.071, Bldg. 1 Cars 30A-35A
	g	ACE Elevator Co. Futura Manual & Magnetek DSD412 Manual Contract WTC 845.071, Bldg. 1 Cars 36A-41A
	h	ACE Elevator Co. CEC Futura Manual PA Contract #WTC 845.071, Bldg. 2 Cars 51A-56A
	i	ACE Elevator Co. Futura and Magnetek DSD412 Manual, Bldg. 1 Cars 87A-92A
	j	ACE Elevator Co. Controller Diagram for cars #93A-98A, PA Contract #WTC-845.071
	k	ACE Elevator Co. CEC Futura Manual PA Contract #WTC 845.071, 14 & 15A
	l	A.C.E. Elevator Co. Inc., Swift Futura, CEC Job No. 3331 cars 14A, 15A 1WTC Velocity/Fault Controller (1/29/9_)
	m	WTC Car 6B Setup Parameters
	n	A.C.E. Elevator Co. Inc., Swift Futura, CEC Job No. 2670 car 6B 2WTC Velocity/Fault Controller (4/18/95)
	o	Schematic Drawings, 2WTC-A.C.E. Elevator (Shuttle Cars) Job No. 3172, Cars 12B, 13B (3/20/97)
4	VDA Studies on WTC Elevator Fleet	
	a	Elevator door study (12/16/99)

ITEM		
	b	Examination of 1 WTC elevators 18-23 (5/11/00)
	c	Examination of 1 WTC elevators 1A-5A & 8A-11A (8/21/00)
	d	Examination of 2 WTC elevators 57B-62B & 87-92 (8/8/00)
	e	Examination of 2 WTC elevators 24B-29B (8/2/00)
	f	Examination of 2 WTC elevators 42B-47B (7/12/00)
	g	Examination of 2 WTC elevators 51B-56B (7/12/00)
	h	Examination of 2 WTC elevators 63B-68B (8/21/00)
	i	Examination of 2 WTC elevators 81B-86B (8/2/00)
	j	Examination of 2 WTC elevators 93B-98B (8/2/00)
	k	Examination of 1 WTC elevators 12A-17A (12/16/99)
	l	Examination of 1 WTC elevators 12A-17A (5/11/00)
	m	Examination of 2WTC elevators 1B-5B & 8B-11B (6/28/00)
	n	Examination of 2 WTC elevators 12B-17B & 18B-23B (8/21/00)
M	ELECTRICAL REPORTS	
1	Operations Services Department Inspection & Safety Division evaluation of the electrical maintenance program at WTC (2/99)	
2	Burlington Engineering Co. Thermographic Scanning NE & SE Plaza buildings (3books) (8/8/96)	
3	Burlington Engineering Co. Thermographic Scanning Subgrade levels including "A" Tower (6/17/96)	
4	Burlington Engineering Co. Thermographic Scanning "B" Tower (2 books) (8/8/96)	
5	Burlington Engineering Co. Thermographic Scanning "A" Tower (8/8/96)	
6	Electrical Capacity Upgrades Summary	
N	BLAST RELATED REPORTS/INFORMATION	

ITEM		
	1	WTC Explosion and Fire Environmental Investigation and Assesment Report
	2	Summary of Structural repairs as a result of February 26, 1993 Explosion (2 copies of 10 drawing sets)
	3	York Water Chiller System Post Blast Equipment Analysis
	4	Letter from Fire Department Attesting to Post-Bomb Adequacy of Life Safety Systems
	5	Description/Status of Fire System CADD
O	LIFE SAFETY CODE ANALYSIS (11/94)	
	1	ADA Transition Plan
	2	Contract WTC-799.56A Fire Safety Director Service 1,2,4 & 5 WTC
	3	Contract WTC-799.610 Maintenance of Office Space Security System Software at the WTC
	4	New Fire Alarm System description & status
P	TENANT CONSTRUCTION GUIDELINES	
	1	Tenant Construction Review Manual
	2	Fire Alarm Guidelines
	3	Electrical Communication
	4	HVAC, Plumbing & Fire Protection
	5	Architectural & Structural
	6	Pro Forma Applications
Q	MAPS & DRAWINGS	
	1	Tenant Location Plans / Space Book Plan
	2	Architectural Drawings of Property (10 CD-rom)
	3	Above-Grade Survey
	4	Detailed Retail Drawings
	5	Detailed Retail Drawings (4 CD-rom)
	6	CADD Drawings of the Subgrade

ITEM		
	7	Highly Illustrative Subgrade Drawings
	8	Subgrade Drawings (4 CD-rom)
	9	Parking Map
	10	Damage Map Pertaining to the Acquisition of Certain Real Property by the PA for WTC
	11	Base Building One-Line System Drawing
	12	Stack Plans
R	PUBLIC SPACE RENOVATION MASTER PLAN	
	1	Davis, Brody& Associates World Trade Center Master Plan
	2	Renovation Development Proposal (LaSalle Partners)
	3	Renovation Development Proposal (The O'Conner Group)
	4	Renovation Development Proposal (LCOR/The Hahn Company)
		a. Volume 1: Development Team (2/1/95)
		b Volume 2: Base Design Concept (2/1/95)
		c Volume 3: Development, Management and Operating Proposal (2/1/95)
		d Volume 4: Financial Proposal (2/1/95)
		e Volume 5: Alternative Proposal (2/1/95)
		f Volume 6: Design Concept, Retail Plan, and Events Presentation (2/16/95)
		g Revised Proposal
	4	WTC Preliminary Study to Reduce Plaza Windiness
	5	WTC Plaza Stone Site Investigation
	6	Smoke Management Design Criteria
	7	Life Safety Systems & Emergency Evacuation
	8	Halcyon Report, Area Worker and Visitor Survey
S	AGREEMENTS	
	1	Agreements/Memorandums of Understanding

ITEM		
	a.	Union Agreements
	b	Power Authority of the State of New York Agreement
	c	Memorandum of Understanding ("MOU") with NYC Fire Department & Amendment
	d	MOU with NYC Building Department
	e	Agreement between the PA and NYC Pertaining to Certain Street Closings and a Change in the City's Waterfront Plan to Accommodate Certain Landfills being Created in Connection with the Development of WTC (6/67)
	f	Agreement between the PA and NYC Pertaining to Certain Street Closings in Connection with the Development fo WTC (1/68)
	g	Agreement between NYC, Fisher Liberty Co. and the PA Pertaining to the Liberty Street Pedestrian Bridge (8/76)
	h	Agreement between NYC and the PA Pertaining to the Liberty Street Underpass (5/12/80)
	i	Agreement between NYC and the PA Pertaining to the Dey Street Underpass (5/80)
	j	Settlement Agreement among NYC WTC7, and the PA Pertaining to the Vesey Street Deck (4/84)
T	LEGAL INFORMATION	
1	Pending Litigation Materials	
	a	Summons dated 11/10/99 with Dean Witter Reynolds Inc. against The Fund for Regional Development and Port Authority of New York and New Jersey (Index No. 605118/99)
	b	Answer dated 5/25/00 regarding Summons with Dean Witter Reynolds Inc. against The Fund for Regional Development and Port Authority of New York and New Jersey (Index No. 605118/99)
	c	Summons dated 1/7/00 with Guy Carpenter and Company Inc. against The Fund for Regional Development and Port Authority of New York and New Jersey (Index No. 600091/00), together with Complaint dated 12/29/99 attached thereto
2	Commonwealth Land Title Insurance Co. Documentation	

ITEM		
	a.	Title Commitment
	b	Copies of Recorded Easements and other Exceptions to Title
	c	Easement Agreement among PA, PATH, BPCD and BPCA (9/81) and Amendments thereto (2/82, 1/84)
	d	Letter from R. Gochfield, Dept. of City Planning, City of NY to H. Barr, PANYNJ re: Proposed Change in City Map for the WTC, with attached surveys
U	INTELLECTUAL PROPERTY INFORMATION	
	1	Schedule of Patents, Trademarks, Tradenames and Copyrights Held or Used and Documentation Relating to Related Claims
V	MISCELLANEOUS	
	1	Engineering Department Professional and Technical Service Firm Rosters for the Architectural, Electric, Environmental, Mechanical and Structural Disciplines
	2	World Trade Center Tenant Manual
	3	PA Comprehensive Annual Financial Report for the Year ended 12/31/99

ATTACHMENT 4

World Trade Center-Proposed 2001 Capital Plan

[redacted] TRADE CENTER - PROPOSED 2001 CAPITAL F[redacted] - ROUGH BREAKDOWN BY BUILDING

($'s in thousands)

Proj Title	2001	Bldg 1	Bldg 2	Bldg 4	Bldg 5	Retail Mall	Subgrade	Central Sys
Electrical & HVAC Capacity Upgrade								
HVAC Distribution System Rehabilitation	1,000	400	400	100	100			
1 WTC 3d Zone Electrical & HVAC Capacity	1,000	1,000						
HVAC Control System/Smoke Mgmt	1,000					1,000		
HVAC Distribution Capacity Upgrade	2,500		2,500					
Freeze Protection Systems	1,000	1,000						
Plaza Bldg Electrical Capacity Upgrade	2,000			1,000	1,000			
New Fire Alarm System								
Fire Alarm System Phase 3 - PA Work	8,000	2,000	2,000	500	500		3,000	
Fire Alarm System Phase 3 - Tenant Reimb	250	100	100		50			
Other Building Systems Upgrades								
Operations Control Center	500							500
Tenant Standby Power	2,000							2000
Substation Ground Fault Protection	500							500
Antenna & Mast Rehabilitation Projects	500	500						
Building Mgmt/Energy Mgmt Systems	500							500
Common Area Improvement Programs								
Public Space Code Improvements	2,500					2,500		
Public Space Infrastructure Improvements	3,000					3,000		
Mall Circulation Improvements Phase 2	500					500		
Priority Customer Service Improvements	4,000	500	500			3,000		
Subgrade Rehabilitation Programs								
Subgrade Slab Rehabilitation Phase 1	10,000						10,000	
Subgrade Slab Rehabilitation Phase 2	500						500	
Subgrade Code Upgrade Projects	500						500	

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W TRADE CENTER - PROPOSED 2001 CAPITAL F - ROUGH BREAKDOWN BY BUILDING

($'s in thousands)

Proj Title	2001	Bldg 1	Bldg 2	Bldg 4	Bldg 5	Retail Mall	Subgrade	Central Sys
Security Programs								
Permanent Security Project	500							500
Office Space Security System	500							500
Security Modernization Projects	5,000							5,000
Elevator and Escalator Modernization Programs								
Elevator Control Modernization - Tower 1	3,500	3,500						
Elevator Control Modernization - Tower 2	3,500		3,500					
Plaza Bldg Elevator Control Modernization	500			250	250			
Asbestos Abatement Shuttle Shafts	500	500						
Elevator Disconnect Switches	1,000	500	500					
Tenant Space Prep/Landlord Work Projects								
Lease Obligated Capital Work	2,000	750	750			500		
Multi-Tenant Floor Corridor & Restrm Rehab	3,000	1,000	1,000			1,000		
Building Infrastructure Rehabilitation Programs								
Priority Capital Major Work Projects	500							
Capital Major Work Projects	5,000	1,000	1,000					2,000
Other Asbestos Abatement	500		250	250				
ADA Projects	250					125	125	
GRAND TOTAL	68,000	12,750	12,500	2,100	1,900	11,625	14,125	11,500

Draft - 11/3/00

ATTACHMENT 5

World Trade Center-Proposed 2002-2005 Capital Plan

WORLD TRADE CENTER - PROPOSED 2002-2005 CAPITAL PLAN - ROUGH BREAKDOWN BY BUILDING

($'s in thousands)

Proj Title	2002	2003	2004	2005	2002-2005	Bldg 1	Bldg 2	Bldg 4	Bldg 5	Retail Mall	Subgrade	Central Sys
Electrical & HVAC Capacity Upgrade												
HVAC Control System/Smoke Mgmt	2,000	3,000	5,000	5,000	15,000	2,500	2,500					10,000
HVAC Distribution Capacity Upgrade	2,000	2,000	3,000	3,000	10,000	2,000	4,000					4,000
Freeze Protection Systems	1,000	1,000	1,000	1,000	4,000	1,000	3,000					
Plaza Bldg Electrical Capacity Upgrade	2,000	2,000	2,000	2,000	8,000			3,000	3,000			2,000
New Fire Alarm System												
Fire Alarm System Phase 3 - PA Work	8,000	4,000	0	0	12,000						10,000	2,000
Fire Alarm System Phase 3 - Tenant Reimb	250	0	0	0	250	100	100	50				
Other Building Systems Upgrades												
Operations Control Center	500	500	500	500	2,000							2,000
Tenant Standby Power	2,000	2,000	2,000	2,000	8,000							8,000
Antenna & Mast Rehabilitation Projects	500	500	500	500	2,000	2,000						
Building Mgmt/Energy Mgmt Systems	1,000	1,000	2,500	2,500	7,000							7,000
Common Area Improvement Programs												
Public Space Code Improvements	2,000	2,000	2,000	2,000	8,000					8,000		
Public Space Infrastructure Improvements	5,000	5,000	5,000	5,000	20,000					20,000		
Mall Circulation Improvements Phase 2	2,000	5,000	6,000	5,000	18,000					18,000		
Priority Customer Service Improvements	3,000	3,000	3,000	3,000	12,000	2,000	2,000	1,000	1,000	6,000		
Subgrade Rehabilitation Programs												
Subgrade Slab Rehabilitation Phase 1	6,000	0	0	0	6,000						6,000	
Subgrade Slab Rehabilitation Phase 2	1,000	5,000	5,000	5,000	16,000						16,000	
Subgrade Code Upgrade Projects	1,000	1,000	1,000	1,000	4,000						4,000	

Draft - 11/3/00

WORLD TRADE CENTER - PROPOSED 2002-2005 CAPITAL PLAN - ROUGH BREAKDOWN BY BUILDING

($'s in thousands)

Proj Title	2002	2003	2004	2005	2002-2005	Bldg 1	Bldg 2	Bldg 4	Bldg 5	Retail Mall	Subgrade	Central Sys
Security Programs												
Office Space Security System	250	250	250	250	1,000	400	400	100	100			
Security Modernization Projects	3,000	3,000	3,000	3,000	12,000							12,000
Elevator and Escalator Modernization Programs												
Elevator Control Modernization - Tower 1	3,500	3,500	3,500	3,000	13,500	13,500						
Elevator Control Modernization - Tower 2	3,500	3,500	3,500	3,000	13,500		13,500					
Asbestos Abatement Shuttle Shafts	500	500	500	500	2,000	1,500	500					
Elevator Disconnect Switches	500	0	0	0	500	250	250					
Tenant Space Prep/Landlord Work Projects												
Lease Obligated Capital Work	2,000	3,000	3,000	3,000	11,000	4,000	4,000	1,000	1,000	1,000		
Multi-Tenant Floor Corridor & Restrm Rehab	3,000	3,000	3,000	2,000	11,000	4,500	4,500	1,000	1,000			
Building Infrastructure Rehabilitation Programs												
Priority Capital Major Work Projects	500	500	500	500	2,000							2,000
Capital Major Work Projects	5,000	5,000	5,000	5,000	20,000	2,000	2,000	500	500			15,000
Other Asbestos Abatement	500	500	500	500	2,000	600	600	150	150		500	
ADA Projects	250	250	250	250	1,000	100	100			800		
GRAND TOTAL	61,750	60,000	61,500	58,500	241,750	36,450	37,450	6,800	6,750	53,800	36,500	64,000

Draft - 11/3/00

ATTACHMENT 6

R.W. Crandlemere & Associates Environmental Site Assessment Phase I Report
(Separate binder)

ATTACHMENT 7

BOCA Group International, Overall Observation

BOCA GROUP
INTERNATIONAL, INC.
VERTICAL TRANSPORTATION CONSULTING

December 5, 2000

Mr. Robert Weiland
Merritt & Harris
110 East 42nd Street
Suite 1200
New York, NY 10017-5685

RE: **ONE, TWO, FOUR & FIVE WORLD TRADE CENTER**
OVERALL OBSERVATION

Dear Mr. Weiland:

Our engineers performed a visual observation and reviewed contracts and documentation, as listed below, of the elevators at the above referenced projects. The elevators and escalators were observed on a "specimen sample" basis. A few units from each building were observed, and these were broken down into units where the "complete modernization" was finished and units where modernization had not been performed as of November 1, 2000. According to the specifications, the modernization is being performed in two phases, the Overlay Modernization Phase and Complete Modernization Phase.

List Of Documents Reviewed

We also reviewed a few documents at the Port Authority Vertical Transportation Office. The following is a list of the documents we observed:

1. World Trade Center Property Book
2. Offering Memo
3. The Port Authority of NY and NJ
   - The World Trade Center Contract WTC – 845-071 "Modernization of Elevators, Dumbwaiters and Escalators @ One World Trade Center" March 1994
   - The World Trade Center Contract WTC – 838-071 "Modernization of Elevators and Escalators @ Four and Five World Trade Center" September 1993
   - The World Trade Center Contract WTC – 846-071 "Modernization of Elevators and Escalators @ Two World Trade Center" March 1994

200 PARK AVENUE • NEW YORK, NY 10166
TELEPHONE (212) 983-7010 • FAX (212) 983-7011 • E-MAIL info@bocagroup.com
www.bocagroup.com

- Maintenance Contract for World Trade Center - 799.700 Maintenance.

4. VDA Maintenance Surveys
   i. dated June 14, 2000 (Elevators 1A – 5A, & 8A – 11A
   ii. dated August 2, 2000 (WTC tower "B" Local Elevator nos. 63, 64,65,66,67 & 68)
   iii. dated August 21, 2000 (Elevators 81B – 86B)
   iv. dated October 16, 2000 (Elevators 75B – 85B in Two WTC)

5. Correspondence dated October 17, 2000 from the Port Authority to ACE Elevator Company.

6. Monthly callback summaries on elevators with greater than two outages (April, May, June, August, September and November, 1999; January –May 2000 and July –October 2000) for One World Trade Center and Two World Trade Center.

7. OCC DECK Reports dated 10/16/00 and 11/1/00.

FORM OF REPORT:

Following this overall observation, is a summary of the scope of work included in the modernization of the elevators located within the World Trade Center.

A status of the elevator modernization program follows the overall observations. The sub-grade units are listed immediately following the status report, which is followed by a listing of the tenant units and the retail units that we observed in the layout drawings.

A section discussing the current maintenance being performed follows the previously described sections.

Detailed reports on the individual buildings follow the status of the elevator modernization. These reports describe the equipment that we observed and also list information that we gleaned from the documents that we reviewed.

At the end of each section are the traffic calculations and analyses for the various buildings. Please note that these calculations do not include any of the tenant owned and operated elevators

The following sections include reports for the individual buildings.

GENERAL NOTES

The four buildings have a total of 238 elevators 126 of them have been modernized, 8 already in progress and 104 not yet started but scheduled for a future date. Most of the modernized elevators have SCR Drives with CEC Swift Futura Controllers, door operators retrofitted with solid state controls to interface with the new controllers all

giving the elevator better service and a better quality ride. All passenger elevators have had cab refurbishing, all but two are ADA compliant.

Due to a previous elevator incident at Two World Trade Center elevators 18-23B were excluded from our inspection.

Five tenant owned and operated elevators were not observed and form part of this report by reference only.

Upon inspection of the hoistway we observed the hoistway doors are fire rated with UL certification labels. To provide a statement on the hoistway walls being fire rated, a sampling would be necessary. This was not performed during our inspection which was of a visual nature.

All Escalators have been modernized with start/stop switch, comb plate switch, demarcation lights, caution signs, controlled descent devices, remote monitoring system, Carl White device (new for every device).

The PATH Escalators are excluded from the scope of this report.

SPECIAL ELEVATOR FEATURES

Track and saddle inserts have been installed predominately in tower shuttles and D Bank reducing friction between saddle and gibs minimizing stack effect problems on elevators.

Buildings One World Trade Center and Two World Trade Center provide a warning device, located on the 108 Floor, which rates the wind sway that automatically reduces the speed of the elevators to prevent possible damages. Accordingly, the shuttle elevators have the ability to have speed reduced automatically from 1600 Feet Per Minute to 1000 Feet Per Minute whenever strong wind conditions are observed and a warning system is activated as described below.

In buildings One World Trade Center and Two World Trade Center, elevators Nos. 14 and 15 have hoistway wall roller followers, which have proven to be successful in minimizing wall erosion due to rope contact. The followers are installed on all the high-rise shuttles, elevator Nos. 6 and 7 in each tower.

In all buildings the elevators can be recalled down to their respective lobbies via the elevator start consoles.

We hope you find this report useful in the due diligence analysis of the aforementioned properties. If you have any questions, please call the undersigned at (212) 983-7010

Sincerely,

BOCA Group International, Inc.,

Vish Shetty

Elevator Modernization – Summary of Scope of Work
(As of 11/1/2000)

Shuttle Elevators

Removal of existing equipment, designing, fabricating, delivering and installing an operating overlay prior to ordering full modernization.

Removal of existing equipment, designing, fabricating, delivering and installing a complete modernized elevator.

Remove existing motor generator, design, deliver and install new silicone controlled rectifier (SCR) power conversion units.

Design, fabricate, deliver and install revised emergency power operation line starter selection.

Removal of existing hall call fixture and designing, fabricating, delivering, and installing of a new hall call fixture.

Removal of existing hall lanterns and designing, fabricating, delivering and installing of new hall lanterns.

Removal of existing jamb markers and designing, fabricating, delivering and installing of new jamb markers.

Design, fabricate, deliver and install new car to lobby (CTL) key switch with updated wiring changes.

Local Elevators

Removal of existing equipment, designing, fabricating, delivering and installing an operating overlay prior to ordering full modernization.

Removal of existing equipment, designing, fabricating, delivering and installing a complete modernized elevator including SCR drives and microprocessor based controllers.

Design, fabricate, deliver and install new car to lobby (CTL) key switch with updated wiring changes.

Design, fabricate, deliver and install revised emergency power operation line starter selection.

Removal of existing hall call fixture and designing, fabricating, delivering and installing of a new hall call fixture.

Removal of existing hall lanterns and designing, fabricating, delivering and installing of new hall lanterns.

Removal of existing jamb markers and designing, fabricating, delivering and installing of new jamb markers.

Freight Elevators

Removal of existing equipment, designing, fabricating, delivering and installing an operating overlay prior to ordering full modernization.

Removal of existing equipment, designing, fabricating, delivering and installing a complete modernized elevator including SCR drives and microprocessor based controllers.

Removal of existing door protective devices and designing, fabricating, delivering and installing of door protective devices.

Provide new freight elevator hall lanterns at each landing served. This includes designing, fabricating, delivering and installing new hall lanterns.

Removal of existing jamb markers and designing, fabricating, delivering and installing of new jamb markers.

Status of WTC Elevator Modernization Program

(as of 11/1/2000)

	1 WTC		
	Complete	In Progress	Future
Local	56	3	13
Low-Rise	0	0	8
High-Rise	6	0	7
Freight	2	0	4

	2 WTC		
	Complete	In Progress	Future
Local	37	2	33
Low-Rise	0	0	8
High-Rise	6	2	5
Freight	1	0	5

	4 WTC		
	Complete	In Progress	Future
Local	11	0	1
Freight	0	0	2

	5 WTC		
	Complete	In Progress	Future
Local	7	1	1
Freight	0	0	2

SUBGRADE		
Complete	In Progress	Future
0	0	15

SUB-GRADE ELEVATORS

ELEVATORS SERVING SUB-GRADE ONLY

ELEVATOR	FLOORS SERVED
K2	Front: B1 Rear: B4, B5, B6
K1	1, B1
FE5	B1-B3
FE8	43-44
J4	1, B1
FE1	B2, B1, 1
FE2	B2, B1, 1
FE3	B1, 1, 2-9
FE4	B1, 1, 2-9

ELEVATORS SERVING SUB-GRADE IN ADDITION TO OTHER FLOORS

ONE WORLD TRADE CENTER

ELEVATOR NUMBERS 50, 7, 49, 17, 48, 5, ARMOR CAR, ALL "J" CARS, 36, 41, 42, 47, 35, 30, 29, 24.

TWO WORLD TRADE CENTER

ELEVATOR NUMBERS 50, 7, 49, 17, 48, 5, ARMOR CAR, ALL "K" CARS, 36, 41, 42, 47, 35, 30, 29, 24.

TENANT ELEVATORS AND ESCALATORS

FIVE WORLD TRADE CENTER

UNIT TYPE	UNIT NUMBER	FLOORS SERVED	# OF UNITS
ESCALATOR	CSE 1 AND CSE 2	2 TO 3AND 3 TO 2	2
ESCALATOR	NONE	1 TO 2, 2-3 AND 3-2	3
HYDRAULIC ELEVATOR	BORDERS BOOK STORE	1,2,3	1

FOUR WORLD TRADE CENTER

UNIT TYPE	UNIT NUMBER	FLOORS SERVED	# OF UNITS
ELEVATOR	1 AND 2	1, 3, 4, 5 6	2
ELEVATOR	SWISS BANK	NOT AVAILABLE	1

RETAIL ESCALATORS

We have been informed by the Vertical Transportation Department of the Port Authority of NY and NJ that these units incur unusually high maintenance costs due to high traffic volume and also due to the fact that these escalators are used to transport handcarts and other wheeled carriages.

ONE WORLD TRADE CENTER

NONE

TWO WORLD TRADE CENTER

NONE

FOUR WORLD TRADE CENTER

ESCALATORS NEAR LIBERTY STREET BETWEEN HSBC ATM AND NEWS STANDS (2 UNITS) (E14 AND E15)

ESCALATORS BETWEEN AU BON PAIN (E17 AND E18), VICTORIA'S SECRET AND BATH AND BODY WORKS

FIVE WORLD TRADE CENTER

CONCOURSE TO PLAZA (E19 AND E20)

ESCALATORS BETWEEN NINE WEST AND TOURNEAU STORES (2 UNITS) (E1 AND E2)

ESCALATORS TO SIX WORLD TRADE CENTER NEXT TO CHOICE COURIER (2 UNITS)

ELEVATOR MAINTENANCE

We performed a visual inspection of the 21 pre-selected elevators and a few escalators in buildings One, Two, Four, and Five World Trade Center, we have gathered that the equipment has to be closely monitored by the Vertical Transportation Department of the World Trade Department. We have also reviewed maintenance evaluation reports submitted by an independent third party based upon their field observations. These reports indicate deficiency items mostly related to house keeping, some of which remain to be corrected. The indications on the third party reports in reference to the preventive maintenance practices range from "acceptable" to "marginally acceptable" with "definite room for improvement in the area of housekeeping". Nevertheless, it appears from the correspondence we observed and during our general discussions that a great deal of close monitoring and follow up from the Vertical Transportation Department is required for the elevator maintenance company to respond to schedule requests as well as perform preventive maintenance. We understand that the elevator company does not inform the PA about any past problems or future repairs that need to be scheduled as a result of which the problems persist.

Additionally, we reviewed the maintenance callback sheets listed previously after which we performed a visual inspection of additional machine rooms in One World Trade Center and Two World Trade Center. This field visit revealed a large amount of rouged cables and bad machine bearings. The rouged cables are contributing largely to the amount of dust and dirt in the machine room, on the machine room equipment and secondary equipment. This condition will most likely cause contact failures, electrical shorts and other potential hazards to the equipment and its workers. There was a significant amount of bad machine bearings observed which are causing noise and vibration in the machines. If this is not corrected soon more serious damage will be caused to the hoist machines.

It was also noted that a few elevators had temporary jumpers on the controller, which is not a generally accepted practice in the elevator industry and could be potentially dangerous.

The following section describes some of the significant deficiencies that we observed all of which are covered under the full-service maintenance contract in effect.

SIGNIFICANT MAINTENANCE ITEMS

ONE WORLD TRADE CENTER

Major Maintenance Items:

1. Excessive dust in all machine rooms observed
2. Rouged cables on Elevators 74, 1, 4, 66, 58, and 60
3. Cables with breaks on Elevators 63 and 64

4. Defective machine bearings on Elevators 72, 46 and 61

Other Maintenance Items:

Elevators Nos. 63 - 68:
Elevator No. 63 - Many breaks in cables.
Elevator No. 64 - Many breaks in cables.
Elevator No. 65 - Relevels many times, Cables are filthy
Elevator No. 66 - Slightly rouging of hoist cables.
Elevator No. 68 - Excessive carbon dust in hoist motor.

Elevators Nos. 57 - 62:
Elevator No. 58 - Cables have excessive rouging - all in machine.
Elevator No. 59 - Carbon dust excessive in hoist machine.
Elevator No. 60 - Rouge in cables
Elevator No. 61 - Vibration in main bearing and excessive carbon dust in machine.

Elevators Nos. 49, 69 - 74:
Elevator No. 49 - Four temporary jumpers on controller. Large amount of dust in hoist machine and motor.
Elevator No. 69 - Excessive rouge dust in hoist machine.
Elevator No. 72 - Bad main bearing - whole machine rocks.
Elevator No. 73 - Rouge dust around and in internal brake.
Elevator No. 74 - Excessive cable rouge - all over and in machine.
Rouge on Machine room floor.

Elevator No. 16 - Cable has broken lay. Secondary rouged cables - rouge all over machine room. We were informed that one of the hoist cables broke, started untwisting and came in contact with metal causing a spark, which started a fire in secondary. Elevator shut down for repairs.

Elevator No. 74 - Cables rouged - Rouge all over machine room.

Elevator No. 72 - Bad main bearing - machine rocks.

Elevator No. 1 - Excessive cable rouging condition and excessive oil on brake pads.

Elevator No. 4 - Excessive cable rouge.

Elevator No. 46 - Bad main bearing and cables are rouged.

TWO WORLD TRADE CENTER

Major Maintenance Items:

1. Rouged cables on Elevators 8, 9, 63-68 ,72, 2, 7, K5, 26 and 28.
2. Bad machine bearings on Elevators 11, 56, 73 and 26
2. Excessive dust in machine room.

Other Maintenance Items:

Elevators Nos. 1-5:
No. 1 Elevator - Carbon dust in hoist motor - cables rouged all over. Oil on brake pads.
No. 2 Elevator - Cables rouged all over - Pie Plate Selector very noisy.

Elevators Nos. 6, 7, 50 and 99: Carbon dust in all hoist motors
No. 6 Elevator - Oil on brake pads.
No. 7 Elevator - Rouged cables caused excessive rouge deposits all over machine.
No. 49 Elevator - Jumper on controller, rouge all in controller, carbon dust excess in hoist motor.

Elevators Nos. 12 - 17: Dust in all machines
Elevator No. 16 - Excess carbon dust in hoist motor & rouge on drive sheaves.
Elevator No. 14 - Car oil seepage in main bearing sheave side

Elevators Nos. K3 - K5:
Elevator No. K5 - Rouge on cables - Not bad.

Elevators Nos. 24-29:
Elevator No. 26 - Bad main bearing and cable rouging.
Elevator No. 28 - Cable have rouging - rouge in hoist machine.
Elevator No. 27 - Rouge dust in hoist machine.

Low Rise Shuttles
Elevator No. 8B - Cables rouged causing rouge all over machine room.
Elevator No. 9B - Cables rouged causing rouge all over machine room.
Elevator No. 10B - Low Brushes and rouge all over machine room.
Elevator No. 11B - Bad main bearing and rouge all over machine room.

Elevators Nos. 51 - 56:
Elevator No. 56 - Bad main bearing

Elevators Nos. 57 - 62:
Elevator No. 62 – Full size hoist motor brushes are not in contact with commutator.
Many brushes are low.

Elevators Nos. 63 - 68:
Elevator No. 63 - Cables rouged.
Elevator No. 64 - Cables rouged.
Elevator No. 65 - Cables rouged.
Elevator No. 66 - Cables rouged causing rouge all over hoist machine.
Elevator No. 67 - Cables rouged causing rouge all over hoist machine.
Elevator No. 68 - Cables rouged all over, and oil leak in main bearing.

Secondary – There are thick amounts of rouge all over. Generator copper shavings inside and carbon excessive

Elevators Nos. 69 - 74:
Elevator No. 72 - Car cables rouged; rouge all over machine room.
Elevator No. 73 - Main bearing real bad, whole machine shakes.

MAINTENANCE ITEMS

The two OCC Deck reports show many long outstanding maintenance items, some dating as far back as March 2000. This is indicative of poor response from the elevator company.

CALLBACKS

The following charts summarize the callback information that was provided to us as indicated in item #6 under the list of documents reviewed.

A review of the charts will indicate an excessive amount of callbacks on both old units and new units. Although all callbacks may not be attributed to poor maintenance, they are a good indicator of preventive maintenance and while difficult to eliminate totally, can be minimized with a good maintenance program in place. The excessive callbacks shown on the charts for some units are especially unacceptable on the modernized elevators. (The average number of callbacks (>2 only) for new units (for 15 months) is 5.75 for One World Trade Center and 3.45 for Two World Trade Center). As per one of the major elevator manufacturers and installers, an acceptable shutdown frequency for a controller related problem would be one per year per elevator.

ELEVATORS WITH >2 CALLBACKS						
MONTH	ONE WORLD TRADE CENTER			TWO WORLD TRADE CENTER		
	OLD UNITS	NEW UNITS	TOTAL	OLD UNITS	NEW UNITS	TOTAL
Apr-99	73	9	82	48	3	51
May-99	45	13	58	58	14	72
Jun-99	58	22	80	34	13	47
Aug-99	29	20	49	17	10	27
Sep-99	20	29	49	36	14	50
Nov-99	34	46	80	40	14	54
Jan-00	21	9	30	32	10	42
Feb-00	34	15	49	18	16	34
Mar-00	34	37	71	51	10	61
Apr-00	16	29	45	31	18	49
May-00	30	25	55	29	6	35
Jul-00	25	37	62	29	6	35
Aug-00	25	14	39	29	7	36
Sep-00	6	21	27	21	4	25
Oct-00	17	42	59	44	7	51
TOTAL	467	368	835	517	152	669

TOTAL UNITS WITH >2 CALLBACKS		
	ONE WORLD TRADE CENTER	TWO WORLD TRADE CENTER
Apr-99	15	10
May-99	11	14
Jun-99	18	11
Aug-99	11	7
Sep-99	8	11
Nov-99	17	14
Jan-00	9	10
Feb-00	13	7
Mar-00	17	12
Apr-00	8	13
May-00	13	10
Jul-00	10	12
Aug-00	11	8
Sep-00	7	5
Oct-00	13	11

SECTION V – EXISTING PROPERTY DESCRIPTIONS & CONDITIONS

A. Component Description

Building Type	Commercial Office Building
Built-Circa	1975
Certificate of Occupancy	A Certificate of Occupancy has not been issued by the City of New York because property owned by the Port Authority is not subject to the Building Code of the City of New York. We have observed "Permits to Use or Occupy" issued by the Port Authority for specific work, notably the October 10, 1997, Permit issued following completion of repairs following the 1993 bombing, but the Port Authority did not routinely issue the equivalent of a Base Building Occupancy Certificate until January 1992. In addition, in December 1995, the Port Authority started an optional "Professional Self-Certification" program for alteration work by tenants. The PA has issued "Consent to Occupy" certificates for specific work under this program.
Story Height	12' 0" typical; 4th floor is 16' 0"
Number of Stories	6 office stories (Floors 4 - 9) Note that Concourse, Plaza, and 3rd floor retail areas are included in the separate retail report
Building Height	The overall building height from concourse level to the roof is 124'
Total Sq. Ft. (Bldg. Area)	As presented in Property Book 581,238 gsf (gross sq. ft.) 632,782 rsf (rentable as remeasured by REBNY 1987 Guideline 612,958 rsf (May 31, 2000, Rent Roll Sq. Ft.)

General Breakdown of Floor Uses

Floors	Predominate Uses
9	Offices and mechanical equipment
4-8	Offices
3	See retail report
Plaza	Lobby - See retail report for other spaces at this level
Mall	Lobby - See retail report for other spaces at this level
B-1	Loading docks, storage, mechanical equipment

Special Features

Standby power generator plant for entire complex is located on the roof of this building. See Central Plant report for details.

Design Team

Architect	Minoru Yamasaki & Associates Emory Roth & Sons, P.C.
Structural Engineer	Worthington, Skilling, Helle & Jackson
Mechanical Engineer	Jaros Baum & Bolles
Electrical Engineer	Joseph R. Loring & Associates
Paving Utilities & Foundations	The Port of New York Authority

Recent Renovations

Tenant Buildout – Ongoing
Elevator modernization – Ongoing
Fire alarms in MERs, EMRs, and substations – 1999
Fire Command Console - 1999

B. Project Condition

Overview

Overall the building is in adequate condition for its intended use as a commercial office facility. Building maintenance is performed under a performance based service contract with ABM with oversight by the Port Authority World Trade Department's Building Services Management Division.

Structures

Where they could be seen, the building's structural elements appear to be free from distress, deterioration, settlement, and overloading. Except for a limited area on the 4th floor in the DWR print shop paper storage room, no significant cracks were noted in visible floor slabs or stairwells. The 4th floor cracks were reportedly investigated by the Port Authority's structural consultant in 1998 and a follow-up review was reported in October 2000. The cracks were reported to be

not detrimental and therefore there was no reason for structural repair in this area. Some spray-applied fireproofing has been removed in mechanical rooms for the attachment of equipment hangers and should be replaced. There are also minor areas where fireproofing has been damaged by previous roof leaks. This should be corrected when the mechanical equipment room (MER) is refinished. Structural Integrity Inspection 70 performed August 10, 1999 (available in the Data Room) found the structural conditions to be good, with minor spalling and shrinkage cracks observed. These were to be repaired during office buildout.

Building Exteriors

The building facade appears in fair condition with no active leaks reported. The painted surfaces of the exterior metal elements are beginning to blister and peel. Isolated repairs of the finishes should be expected during the next 5-year period and after that time consideration should be given to an exterior program of wet-scaling and repainting. Exterior plaster soffits under the 4th floor overhang, have been monitored by an independent structural consultant for the past several years. It has been noted that the soffit design is not in accordance with prescriptive NYC Building Code requirements, but is rather based on an alternate design method limited by deflection, approved by the Port Authority as the code administration agency. The design is not substantively better or worse than the NYC Building Code design, but is devised by different engineering methods. Regardless of the design, the ongoing monitoring of the soffits on a regular schedule is a prudent management strategy that should continue.

Roofs

The roof was reportedly replaced in 1991. There is widespread rusting of the metal deck visible in the MER on the 9th floor below, but this condition appears to be a remnant of the old roof problems. It is expected that the roof deck will be scraped and painted when the MER is refinished. The deck acts only as a form for the concrete roof and there is no structural implication to the rust condition. The new roof is a single-ply, loose-laid system with full coverage ballast of walk-on pavers. The pavers are installed over a resilient fiber pad that is designed to protect the membrane from the abrasion of the pavers. An unintended side effect of the pad however, is that water gets trapped under the pavers and never evaporates, leaving the membrane in a constantly wet condition. Widespread vegetation growth is evident at roof drains and parapet flashings.

Interiors	Building common area finishes were originally of good quality and maintenance is adequate for the present tenancy. New buildout of office spaces should be anticipated at the time of lease rollover to new tenants.
Vertical Transportation	The elevators and escalators are maintained under service contract with Ace Elevator Company. The PA performs maintenance Quality Assurance inspections. Some items observed to be deficient were scheduled to be repaired or replaced in the near future. Some items observed to be deficient were scheduled to be repaired or replaced in the near future. Elevator modernization is approximately 73% completed or underway.
HVAC	The mechanical systems are adequately designed, using brand-name equipment, which provides adequate cooling for the office areas. The freeze protection system for the AHUs and reheat system for the heating hot water system has been abandoned in place. Consideration should be given to removal of the equipment for these systems. The equipment has been well maintained, some equipment is original (25 years old), and has or will exceed its published service life over the next 10 years. A recent capital program to update the HVAC air-handling equipment has effectively increased the anticipated service life of the equipment. Equipment or component replacement is performed as part of the ABM service contract.
Plumbing	The plumbing system appears to be in generally good condition. The plumbing systems are reportedly functioning satisfactorily. Although in operation, replacement of the sump pumps, circulating pumps, and water heaters should be anticipated over the next 10 years. Equipment or component replacement is performed as part of the ABM service contract. There have recently been problems with the failure of water hammer arrestors and leaks (see the Executive Summary).
Electrical	The electrical systems are functioning satisfactorily. They provide an adequate 6 watts/ sq. ft.
Life Safety	The life safety systems are typical for a Class "A" office building and meet the New York City Code. A new fire alarm system is currently being installed. Some of the toilet rooms have electrical outlets without ground fault interruption (GFI) protection, which is recommended. Some of the office floors do not have floor layouts, in the elevator lobbies, showing the location of exit stairs to be used in the event of a fire.

Property Maintenance

Electrical, HVAC and general maintenance is performed under the terms of a performance based service contract by ABM Engineering with oversight by the Port Authority World Trade Department's Building Services Management Division. In general maintenance appears to be adequate. Housekeeping deficiencies were noted in stairwells and service areas.

Accessibility

The building entrance, travel routes, and elevators are ADA compliant. ADA compliance on most full tenant floors is reportedly the responsibility of the tenant under terms of the lease. Upgrades to rest rooms, signage, and door hardware for building common spaces should be made on multiple tenant floors.

Violation Status

As stated in the Offering Memorandum, "The Port Authority is a municipal corporate instrumentality and political subdivision of the States of New York and New Jersey which provides transportation, terminal, and other facilities of commerce within the Port District. As such, in connection with the Transaction, the PA will continue to maintain exclusive jurisdiction with respect to certain administrative and governmental matters involving the Complex, including compliance with building, environmental, fire and health codes." The New York City Department of Buildings has indicated that they do not maintain any records of violations for this property. A request for a Property Profile Overview for this block and lot number yields no records. The Fire Department provides normal fire fighting and a life safety service to the facility. A Memorandum of Understanding exists between the Port Authority and the Fire Department in which the Fire Department performs regular inspections and directly notifies the Port Authority Fire and Life Safety group of deficiencies to be corrected. Under a protocol with the New York City Fire Department, Port Authority Police personnel investigate certain fire alarms at the World Trade Center rather than transmitting such alarms to the New York City Fire Department.

C. Site

Site information for all of the buildings is included within the report for the retail mall and plaza.

D. Building Description

1. Structure

Foundation

Structural Integrity Investigation Reports note the building's foundation consists of end bearing steel piles driven to bedrock. Interior pile caps support the building's columns, and perimeter caps support the reinforced concrete foundation walls. Portions of the building are above the old PATH railroad station and Power Plant.

Slab-on-Grade

The B-1 slab-on-grade (located in the north and south MER), is an 18" thick slab spanning grade beams between pile caps. Hydrolithic iron-type (HIT) coat is applied to the slab, and a 3" concrete topping with WWF is cast over the slab.

Superstructure

The building structure is steel wide-flange columns and wide-flange girders and beams, supporting metal deck flooring with reinforced concrete fill. Column spacing is 30' x 30' with a 15' long cantilevered bay at the building perimeter. The exterior wall is supported by steel tube lally-columns around the perimeter. An exterior steel truss structure, protected by aluminum cladding, supports the lowest level of the overhang at the 4th floor. Lateral loads are resisted by bracing in the core area and by moment frames. Spray-applied fireproofing is used on the steel framing members.

Floors

The typical slab construction on a tenant floor is 4" lightweight concrete on 1 1/2" metal deck with top and bottom rebar. The 9th floor mechanical equipment room slabs are 6" normal weight concrete on metal decks with 2" concrete topping over a waterproofing membrane. Metal decks have integral raceways for distribution of electrical power and signal cable on tenant floors.

Design Loads

The following live loads were reported:

Area	Live Load (psf)
Roof	40
Office	100-55varies
Stairs and Public Areas	100 & 125
Mechanical	75
Wind	NYC Building Code
Seismic	Zone 2A

Condition

Where they could be seen, the building's structural elements appear to be free from distress, deterioration, settlement, and overloading. Except for a limited area on the 4th floor in the print shop paper storage room, no significant cracks were noted in visible floor slabs or stairwells. The 4th floor cracks were reportedly investigated by the Port Authority's structural consultant in 1998 and a follow-up review was reported in October 2000. The cracks were reported to be not detrimental and therefore there was no reason for structural repair in this area. Some spray-applied fireproofing has been removed in mechanical rooms for the attachment of equipment hangers and should be replaced. There are also minor areas where fireproofing has been damaged by previous roof leaks. This should be corrected when the mechanical equipment room (MER) is refinished. Structural Integrity Inspection 70 performed August 10, 1999 (available in the Data Room), found the structural conditions to be good, with minor spalling and shrinkage cracks observed. These were to be repaired during office buildout.

2. Exterior

Walls

The building has an irregular shape with a 15' overhanging cantilever at the level of the 4th floor slab. The exterior walls consist of painted metal and glass curtainwall systems. The face of the parapet is an extension of the curtainwall system.

Windows

2' 6" wide by 7' 8" high windows are framed by painted aluminum mullions. Windows on the 4th floor are 11' 4" high. Windows are single glazed. Spandrel panels are painted aluminum with rigid board insulation.

Window Cleaning Equipment

A building mounted window-washing rig running on steel tracks on the roof level is used to provide access for window washing.

Doors

There are various building entrances provided from the 2 grade levels around the building perimeter. Plaza level (2nd Floor) entries are provided west (Tobin Plaza) side of the building. Concourse level (1st floor) access is provided from the north side (Vesey Street) by means of 2 enclosed lobbies and 2 stairways and a ramp up from the concourse retail space. At Church Street there is an entrance between the Plaza and Concourse level at grade. Escalators connect this entrance to the Concourse below, and a stairway connects it to the Plaza level above. Exterior doors are painted aluminum with tempered glass. A combination of revolving doors and swinging doors is used to provide access.

Thermal Insulation — Painted aluminum spandrel panels have rigid insulation on the internal face.

Weatherproofing Sealants — There is elastomeric sealant at the joints in the aluminum window framing. There is rubber gasket glazing for the glass vision panels.

Expansion/Control Joints — Facade expansion joints were not observed, but the wall system has many components with elastomeric sealants and its expansion and contraction is self-relieving.

Other — Entrances are protected by the building overhang at all sides.

Condition — The building facade appears in fair condition with no active leaks reported. Rubber gaskets are replaced from the interior as needed, as part of normal maintenance. The painted surfaces of the exterior metal elements are beginning to blister and peel. Isolated repairs of the finishes should be expected during the next 5-year period and after that time consideration should be given to an exterior program of wet-sealing and repainting. Heavily used entrance doors are maintained in good condition by regular maintenance. Exterior plaster soffits, under the 4th floor overhang, have been monitored by an independent structural consultant for the past several years. It has been noted that the soffit design is not in accordance with prescriptive NYC Building Code requirements, but is rather based on an alternate design method limited by deflection, approved by the Port Authority as the code administration agency. This design would not meet current code wind load requirements. The Port Authority has acknowledged this situation, but given the good condition of the plaster and the longevity of the existing support system has determined that no modifications are required. The ongoing monitoring of the soffits on a regular schedule is a prudent management strategy that should continue.

3 Roof

Roof Area — The main roof areas are above the 9th floor and above the penthouse. Total roof area is approximately 87,525 sq. ft.

System — The roofing system is single-ply, loose-laid membrane system with a lightweight concrete paver ballast cushioned by a fiber backing. It was reportedly installed in 1991.

Decking	The roof is supported by a concrete filled composite metal deck.
Drainage	The roofs are flat with a slight pitch to internal interior roof drains.
Parapets/Copings	There is a 40" high perimeter parapet with glazed brick on the roof side and painted metal copings.
Flashing	All flashings are single-ply membranes extended up and under a metal counterflashing on the parapet wall.
Expansion Joints	N/A
Penetrations and Equipment Mounting	Properly-detailed vent stack penetrations and supports for the window-washing track were observed.
Access	Interior stairway bulkheads are provided at roof level. The penthouse roof is accessible by means of an interior ladder from one of the northwest stairwells.
Skylights	There are no skylights.
Bonds/Warranties	This 9-year-old roof may still be under warranty, but no documentation was provided.
Condition	The roof appears to be in fairly good condition. Some of the pavers have been damaged by weight of heavy equipment from the installation of the standby emergency generator plant. The penthouse roof had a number of pavers removed for patching of the membrane. There was one area of standing water on the floor of the 9th floor MER, but it could not be determined if this was from the roof or from a recent equipment leak. This type of roof installation generally has a 20- to 25-year life expectancy, however, the protective backing used to cushion the membrane from the abrasion of the pavers holds a great deal of water, keeping the membrane constantly wet. This encourages vegetation growth which, combined with the constant wet condition, could lead to premature failure of the membrane. It should be determined if the roofing system is still under warranty. If it is, a transfer of the warranty to new owners may require roof inspection, repairs, and fee payment for the transfer. The manufacturer and/or installer could at that time make recommendations for precautionary steps to extend the life of the membrane.

The roof deck shows extensive rust, apparently resulting from the leaks in the previous roof system. Since the metal deck acts only as a form for the reinforced concrete roof, this is not a structural problem, but the deck should be scraped and painted as part of the MER "Spit and Polish" program.

4. Interior Construction and Finishes

Lobby Areas

The building has 2 lobby areas, one at the Concourse level and one at the Plaza level. Two corridors enter on grade at Vesey Street. The 5 WTC Concourse elevator lobby is located between the 2 corridors at this level protected by a security checkpoint with turnstiles and a guard. The corridors then continue south to 2 stairways and an ADA ramp connecting to the retail Concourse about a half level below. The Plaza level is accessed directly from the outside on the south side from Tobin Plaza. A plan of the Plaza level lobby is included as Attachment 2. There is a pair of escalators connecting this level to the retail Concourse in the west wing, and a stairway down a half level to the Church Street entrance in the northeast quadrant. Lobbies are finished with travertine wall panels, travertine floors, painted plaster ceilings and polished stainless elevator doors and frames.

Core Corridors

The building has an irregular "L"-shaped composed of interlocking squares. Attachment 3 is a typical floor plan. There is a core element in the west section, the northeast section, and the south section. The main core in the northeast contains a bank of 6 passenger elevators, a bank of 3 passenger elevators, 2 freight elevators, a men's and women's rest room, a pair of exit stairs, HVAC shafts, and electrical and telephone distribution closets. A series of paired escalators also occurs in this core between the Plaza level and 5th floor. The west core contains a men's and women's rest room, a pair of exit stairs, HVAC shafts, and electrical and telephone distribution closets. The south core contains a pair of exit stairs, HVAC shafts, and telephone and electrical distribution closets.

Core and corridor finishes on single-tenant floors are as selected by the tenant. Multiple tenant floors do not have standard common area finishes, but are rather a mix of finishes left by prior occupants. In general carpeted floors, vinyl covered walls, and acoustical panel ceilings are used in common areas. Full floor tenants have individualized corridor and elevator lobby finishes.

Tenant Offices

The tenant finishes are typically carpeted floors, vinyl base, painted walls, and suspended lay-in acoustic ceilings with recessed fluorescent fixtures.

Rest Rooms

The northeast and west core each has 1 men's rest room and 1 women's rest room on each office floor. The rest rooms have ceramic tile floors and walls, ceramic tile base, and lay-in suspended acoustic ceilings with down lights. Toilet partitions are ceiling-hung with baked enamel finish.

Exits

There are 6 interior exit stairs that serve all office floors. Stairs have painted concrete floors and concrete filled steel pan treads and intermediate level platforms, and painted walls and ceilings. Stairways and railings are treated with a phosphorescent paint to provide a backup method of indicating the egress path in the event of a failure of the lighting system and emergency lights. Stairways in the west core exit through the lobby at the Plaza level. Stairways in the south core exit through an enclosed corridor directly to the exterior at the Plaza. The stairways in the northeast core continue down and exit through the corridor to Vesey Street at grade.

Sound Insulation

Carpets and suspended acoustic ceilings help to control noise transmission within the building.

Doors

Stair exit doors are self-closing hollow metal fire-rated.

Other

Utility and equipment service rooms usually have painted concrete floor surfaces, and either painted block or gypsum board walls. These rooms are generally open to the structure above.

Condition

Interior finish conditions are adequate for the present tenancy. Building entrance lobby finishes are maintained in sound condition, although the porous travertine flooring is difficult to clean. Updating building lobby finishes at this time would be in response to marketing considerations rather than a need to replace failed materials. Mechanical equipment rooms are presently being prepared for repainting under the Port Authority "Spit and Polish" program. Cleanup of stairway and service corridor debris by the service contractor is required.

5. Vertical Transportation

Overview

The building is served by 9 passenger and 2 freight elevators. Elevators 1 - 6 are overhead geared traction units. Cars 7 - 9 are basement underslung, geared traction units. There is a design deficiency in the overhead clearance for these 3 cars that have made it necessary to decrease the running speeds. The freight cars are geared overhead traction units. In addition to the elevators, there are paired escalators that connect levels Mall (1) and Plaza (2), Plaza and 3, 3 and 4, and 4 and 5 located in the northeast core of the building. Escalators below the 3rd floor are discussed in the retail section of the report.

For details on the vertical transportation equipment, see Attachment 6 to this report section.

Cabs

Passenger cabs have carpeted floors, porcelain enamel wall panels with a narrow band of exposed marble at rail height, brushed stainless steel front panels, and brushed stainless steel center-opening elevator doors. The cabs have been updated to ADA compliance.

Condition

The elevators and escalators are maintained under service contract with Ace Elevator Company. The PA performs maintenance Quality Assurance inspections. Some items observed to be deficient were scheduled to be repaired or replaced in the near future. Some items observed to be deficient were scheduled to be repaired or replaced in the near future. Elevator modernization is approximately 73% completed or underway.

6. HVAC

Overall Systems

Heating and cooling for the building are provided by central station air handling units (AHUs) and perimeter induction units (PIUs).

Heat

Medium pressure steam, supplied from the main steam meter room, goes through pressure reducing stations located in the 9th floor and B-1 Level mechanical equipment rooms (MERs). The low-pressure steam is piped to coils in AHUs, which supply interior spaces and PIUs on the floors.

Low-pressure steam is also piped to shell and tube heat exchangers in both MERs to produce secondary heating hot water, which is pumped to coils in the PIUs.

Additional heat is supplied by steam unit heaters located in mechanical spaces.

Heat Exchangers

Two plate and frame units for the chilled water system

Three shell and tube unit for the condenser water system

Six shell and tube units for the secondary heating hot water/chilled water system

Air Conditioning

Chilled water from the central plant is supplied to coils in the AHUs and secondary chilled water is supplied to the PIUs. Each PIU has one coil, which is used for both heating hot water and chilled water.

Two looped condenser water systems are available for tenants' supplementary water-cooled air conditioning units. The system uses air blown across coils filled with a water/glycol solution, located in the 9th floor MER.

Pumps

Two 40-hp, 500-gpm condenser water pumps
Three 50-hp, 800 gpm condenser water pumps
One 1-hp, 225 gpm make-up water pump

Two 50-hp secondary water pump
Two 40-hp secondary water pumps

Two 200-hp auxiliary chilled water pumps

One duplex steam condensate pump system with a receiver and 2 hp motors.
One duplex steam condensate pump system with a receiver and 3 hp motors.

Air Handling Units

Fourteen central AHUs, located in the 9th floor MER, rated from 19,000 to 56,000 cfm with 20 hp to 150 hp motors, supply conditioned air to interior spaces and the PIUs.

There are 4 AHUs located in the B-1 Level MER that supply the mall areas.

Fans

AHU return air, and toilet, kitchen, and mechanical room exhaust fans are installed.

Condition

The mechanical systems are adequately designed, using brand-name equipment, which provides adequate cooling for the office areas. The freeze protection system for the AHUs and reheat system for the heating hot water system have been abandoned in place. Consideration should be given to removal of the equipment for these systems. The equipment has been well maintained, some equipment is original (25 years old), and has or will exceed its published service life over the next 10 years, and replacement should be anticipated. Equipment or component maintenance is performed as part of the ABM service contract. A recent capital program to update the HVAC air-handling equipment has effectively increased the anticipated service life of the equipment.

7. Plumbing

Storm and Sanitary Sewers

Roof storm water is collected by roof drains and conveyed by internal leaders to the building's storm sewer. Duplex sump pumps are located in the B-1 Level MER.

Sanitary waste flows by gravity to the building's sewer.

Water Service

A metered domestic water line serves the building, and the northern section of the Mall.

Water Pipe Material

Copper supply piping was observed.

Domestic Water Heaters

Domestic hot water is provided by a steam/water pre-heat tank, 2 steam/hot water heaters, and two 50-gal. electric water heaters.

Pumps

Four domestic water pressure booster pumps: one 250-gpm, 25 hp, three 350-gpm, 40 hp

Two 75-hp submerged duplex ejectors

One- 15-hp ejector

Four 1.5-hp submerged duplex sump pumps

Three 3.0-hp submerged duplex sump pumps

One 7.5-hp submerged duplex sump pump system
Two 1/3-hp circulating pumps are installed for the water heaters.

Toilet Rooms	There are 2 sets of men's and women's toilet rooms on each typical office floor.
Condition	The plumbing system appears to be in generally good condition. The plumbing systems are reportedly functioning satisfactorily. Although in operation, replacement of the sump pumps, circulating pumps, and water heaters should be anticipated over the next 10 years. Equipment or component replacement is performed as part of the ABM service contract. Equipment or component replacement is performed as part of the ABM service contract. There have recently been problems with the failure of water hammer arrestors and leaks (see the Executive Summary).

8. Electrical

Main Service	Two electrical substations on the B-1 Level supply the building. One substation supplies power and lighting panels, and in some case step-down transformers, in electrical closets. The other substation supplies a single tenant bus via duct risers located in an electrical closet on Floors 4, 5, and 6. These closets only contain a distribution switch.
Capacity	An adequate 6 watts/sq. ft. is provided.
Wiring	Copper observed.
Emergency Power	Generators, located in the central plant, supply emergency power for lighting, elevators, and the life safety system.
Lighting	Recessed, surface- and wall-mounted and suspended fluorescent fixtures, and wall-mounted incandescent fixtures provide interior building lighting.
Other	Seven telephone/communication closets are located on each typical office floor. A closed circuit television (CCTV) system is installed.
Condition	The electrical systems are functioning satisfactorily. The electrical system is infrared scanned on a regular basis.

9. Life Safety

Sprinklers	The building is completely sprinklered, except for electric and telephone closets, and some toilet rooms. A riser is located in Stairs A, B, E, and F with take-offs for each floor.
Fire Standpipe	Standpipe risers, with a fire hose rack on all floors, are installed in the stairways.
Fire Pumps	A 30-hp, 500-gpm electric pump is located in the 9th floor MER.
Fire Alarm System	A Siemans Cerebrus Pyrotronics MXL fire alarm system is installed with control and annunciator panels, manual pull stations, alarms, audio/visual alarms, strobe lights, flow and tamper switches, fire warden telephones, and smoke detectors. This system is backed up by the Fire Command Center in 4 WTC and also backs up 4 WTC.
Fire Extinguishers	Fire extinguisher cabinets are located in each stair on each floor
Emergency Lighting	Fluorescent fixtures, with battery back-up are located in the stairs, and all elevators in the complex have 2-hour battery back-up lighting. Selected fixtures are connected to emergency circuits.
Exit Lighting	Illuminated exit signs are provided, which are connected to emergency circuits.
GFIs	Installed in some toilet rooms.
Condition	The life safety systems are typical for a Class "A" office building and meet the New York City Code. A new fire alarm system is currently being installed. Some of the toilet rooms have electrical outlets without ground fault interruption (GFI) protection, which is recommended. Some of the office floors do not have floor layouts, in the elevator lobbies, showing the location of exit stairs to be used in the event of a fire.

10. Energy Conservation

General

The building was constructed with certain energy conserving features such as insulated walls and roofing, and SCR drives on the elevators. The elevator relay controllers are being replaced with microprocessors. Most of the lighting fixtures use energy saving fluorescent lamps and electronic ballasts.

Energy Management

The building does not have an energy management system.

11. ADA Compliance

Overview

For the purpose of this report, a general review of the property has been conducted to determine basic compliance with Title III of the federally-enacted ADA, dated July 26, 1990. Under the ADA, buildings initially occupied after January 26, 1993 (or building areas altered after January 26, 1992), are required to comply with ADAAG. Projects, with areas of public accommodation, constructed prior to this date are required to comply forthwith, to the extent it is "readily achievable." Provisions in the Act require Owners of existing properties with public accommodations to identify barriers for physically disabled persons that exist on the site or in buildings. The barriers should be systematically removed according to a given set of priorities, the degree allowed by structural feasibility, and the financial resources available. The obligation to remove barriers is a continuing one.

The ADA sets forth "recommended priorities for public accommodations" to be accessible to the disabled. In general, the three priorities are as follows:

1. Access from public sidewalks, parking, or public transportation to a building entrance,
2. Access to any areas of goods and services that are made available to the public; and,
3. Access to rest room facilities.

During our tour of the project, we noted the following:

The building entrance, travel routes, and elevators are ADA compliant. ADA compliance on most full tenant floors is reportedly the responsibility of the tenant under terms of the lease. Rest rooms have had some minor upgrades for ADA requirements, but in most instances there were still non-compliant items such as insufficient knee space at vanities, lack of full size ADA toilet stalls, and missing grab bars. Upgrades to rest rooms, signage, and door hardware should be made on multiple tenant floors.

12. Code Compliance

Applicable Code

1968 NYC Building Code as Administered by the Port Authority of New York and New Jersey

Building Construction Classification

Type 1-B

Occupancy Type

Group E -Business

Violations Record

As stated in the Offering Memorandum, "The Port Authority is a municipal corporate instrumentality and political subdivision of the States of New York and New Jersey which provides transportation, terminal, and other facilities of commerce within the Port District. As such, in connection with the Transaction, the PA will continue to maintain exclusive jurisdiction with respect to certain administrative and governmental matters involving the Complex, including compliance with building, environmental, fire and health codes." The New York City Department of Buildings has indicated that they do not maintain any records of violations for this property. A request for a Property Profile Overview for this block and lot number yields no records. The Fire Department provides normal fire fighting and a life safety service to the facility. A Memorandum of Understanding exists between the Port Authority and the Fire Department in which the Fire Department performs regular inspections and directly notifies the Port Authority Fire and Life Safety group of deficiencies to be corrected. Under a protocol with the New York City Fire Department, Port Authority Police personnel investigate certain fire alarms at the World Trade Center rather than transmitting such alarms to the New York City Fire Department.

Certificate of Occupancy A Certificate of Occupancy has not been issued by the City of New York because property owned by the Port Authority is not subject to the Building Code of the City of New York. We have observed "Permits to Use or Occupy" issued by the Port Authority for specific work, notably the October 10, 1997, Permit issued following completion of repairs following the 1993 bombing, but the Port Authority did not routinely issue the equivalent of a Base Building Occupancy Certificate until January 1992. In addition, in December 1995, the Port Authority started an optional "Professional Self-Certification" program for alteration work by tenants. The PA has issued "Consent to Occupy" certificates for specific work under this program.

E. RECOMMENDATIONS

We have prepared a listing of items that will require action within the next 10-year period. Immediate expenditures indicate deficiencies which are in violation of codes, which pose a danger to public safety, or which, if left uncorrected, will lead to further deterioration of the property or significantly impact marketability or habitability. Recommended work, not required by agencies or codes, which, in our opinion, represents expenditures that should be made in the context of the prudent management of the property is also listed. These items should be undertaken on a priority basis. Items have been divided into 1- to 5-year and 6- to 10-year time frames.

	IMMEDIATE (0 - 1 YR.)	FUTURE (1 - 5 YRS.)	FUTURE (6- 10 YRS.)
General			
1. The net lessee must continue installation of the new fire alarm system and phased implementation of Local Law 5 and 16 requirements. It is reported that the FDNY has approved this approach.	X	X	X
Structure			
2. Some spray-applied fireproofing has been removed in mechanical rooms for the attachment of equipment hangers and should be replaced. Some spray-on fireproofing areas previously damaged by roof leaks also require repair. It is expected that the missing spray-on in the B-1 and 9th floor MERs will be addressed as part of the pending "Spit and Polish" program. Other incidental areas are patched by in-house staff as they are discovered. When new buildout for tenant vacancy takes place, the space is inspected by Port Authority personnel before the ceiling is installed, and the fireproofing is repaired at that time.	X	X	X

	IMMEDIATE (0 - 1 YR.)	FUTURE (1 - 5 YRS.)	FUTURE (6- 10 YRS.)
Exterior			
3. The building facade appears in fair condition with no active leaks reported. Rubber gaskets are replaced from the interior as needed, as part of normal maintenance. The painted surfaces of the exterior metal elements are beginning to blister and peel. Isolated repairs of the finishes should be expected during the next 5-year period and after that time consideration should be given to an exterior program of wet-sealing and repainting.		X	X
4. Exterior plaster soffits under the 4th floor overhang, have been monitored by an independent structural consultant for the past several years. It has been noted that the soffit design is not in accordance with prescriptive Code requirements, but is rather based on an alternate design method limited by deflection. The monitoring of the soffits on a regular schedule should continue.		X	X
Roof			
5. This type of roof installation generally has a 20- to 25-year life expectancy, however, the protective backing used to cushion the membrane from the abrasion of the pavers keeps the membrane constantly wet. This encourages vegetation growth which, combined with the constant wet condition, could lead to premature failure of the membrane. It should be determined if the roofing system is still under warranty. If it is, a transfer of the warranty to new owners may require roof inspection, repairs, and fee payment for the transfer. The manufacturer and/or installer could at that time make recommendations for precautionary steps to extend the life of the membrane.	X		

	IMMEDIATE (0 - 1 YR.)	FUTURE (1 - 5 YRS.)	FUTURE (6 - 10 YRS.)
6. Scrape and paint rooftop ferrous metals, including the window washing rig tracks.		X	
Interiors			
7. General housekeeping problems such as stair doors and corridors, blocked by stored material or debris were noted. These should be brought to the attention of the maintenance contractor.	X		
8. Current tenancy has full floor occupancy on Floors 4, 5, 6, and 7. Owner has responsibility for common area finishes on multi-tenant Floors 8 and 9. Anticipate the upgrade of corridor finishes including carpets, paint/wallcovering, and ceiling tiles.		X	
9. Repainting of the stairwells should be anticipated.		X	
10. Customer service improvements are budgeted over the next 5 years.		X	

	IMMEDIATE (0 - 1 YR.)	FUTURE (1 - 5 YRS.)	FUTURE (6- 10 YRS.)
Vertical Transportation			
11. Elevator cab finishes have been updated in all passenger cars. Overlay controller, ADA, and Firemen's recall modernization have been completed on 7 passenger cars and on one of the service cars. An elevator modernization program including switchover from motor generator sets to SCRs, and retrofit of door operators, door-reopening devices, etc. has been completed on the equipment for 7 of the 9 passenger elevators. Modernization of one unit is now in progress and the modernization of 3 cars remains to be done. This second stage of the modernization has not begun on the service cars. Completion of the modernization project is scheduled prior to the 1st quarter of 2002.	X	X	
HVAC			
12. Considering the age (25 years) of most of the mechanical equipment, ongoing phased replacement of components should be expected to continue over the next 10 years. This required maintenance is currently accomplished under the terms of the service contract with ABM. An HVAC distribution system rehabilitation project is also budgeted in 2001.	X	X	X
13. Consideration should be given to removal of the pumps and bases, piping, heat exchangers, and valves related to the chilled water freeze protection and hot water reheat systems no longer in use.		X	

	IMMEDIATE (0 - 1 YR.)	FUTURE (1 - 5 YRS.)	FUTURE (6 - 10 YRS.)
Plumbing			
14. Replacement or refurbishment of the sump pumps, circulating pumps, and water heaters should be anticipated over the next 10 years as the equipment reaches the limits of service life. This required maintenance is currently accomplished under the terms of the service contract with ABM.	X	X	X
15. Phased replacement of water hammer arrestors is necessary.	X	X	X
Electrical			
16. Electrical capacity upgrades are budgeted over the next 5 years.		X	
Life Safety			
17. Replace unprotected electrical outlets with GFI protected outlets in all toilet rooms.	X		
18. Install floor plaques, in all elevator lobbies, showing the location of exit stairs to be used in the event of a fire.	X		
19. Fire alarm system upgrades and office space security systems are budgeted over the next 2 years in PA and tenant areas.		X	X

ADA

During our tour of the project, we noted the following areas that do not appear to meet the requirements of ADAAG and suggest that these features be added when feasible or when areas are renovated. It is our understanding that all full-floor tenants are responsible for provision of ADA features within their spaces under lease terms.

1. Provide fully accessible ADA rest rooms on multi-tenant Floors 8 and 9. A choice can be made to either retrofit an existing men's and women's rest room on each floor or to install a single-occupant "unisex" facility on each floor.

2. Install ADA compliant signage with Braille features for all common building spaces (rest rooms, stairways, etc.) on multi-tenant Floors 8 and 9.

F. Attachments

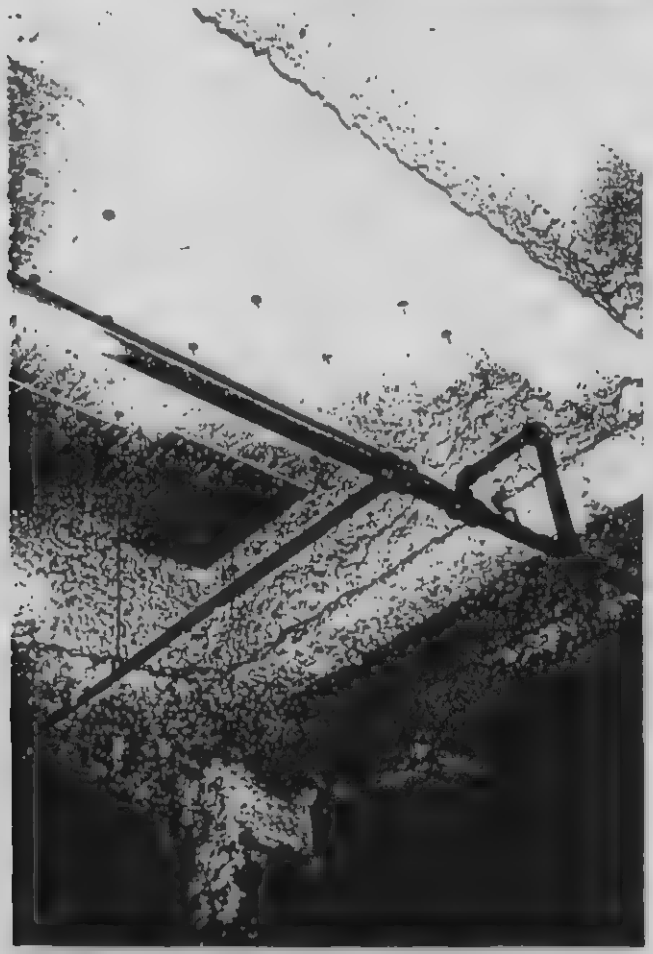
1. Photographs
2. Site Orientation Map (Reproduced with permission from J.P. Morgan Property Book)
3. Lobby Floor Plan (Reproduced with permission from J.P. Morgan Property Book)
4. Typical Floor Plan (Reproduced with permission from J.P. Morgan Property Book)
5. Stacking Plan (Reproduced with permission from J.P. Morgan Property Book)
6. BOCA Group International Elevator Survey Report
7. Crandlemere and Associates Asbestos-Containing Materials Document Review and Evaluation
8. Heitmann & Associate Curtain Wall Evaluation

ATTACHMENT 1

Photographs

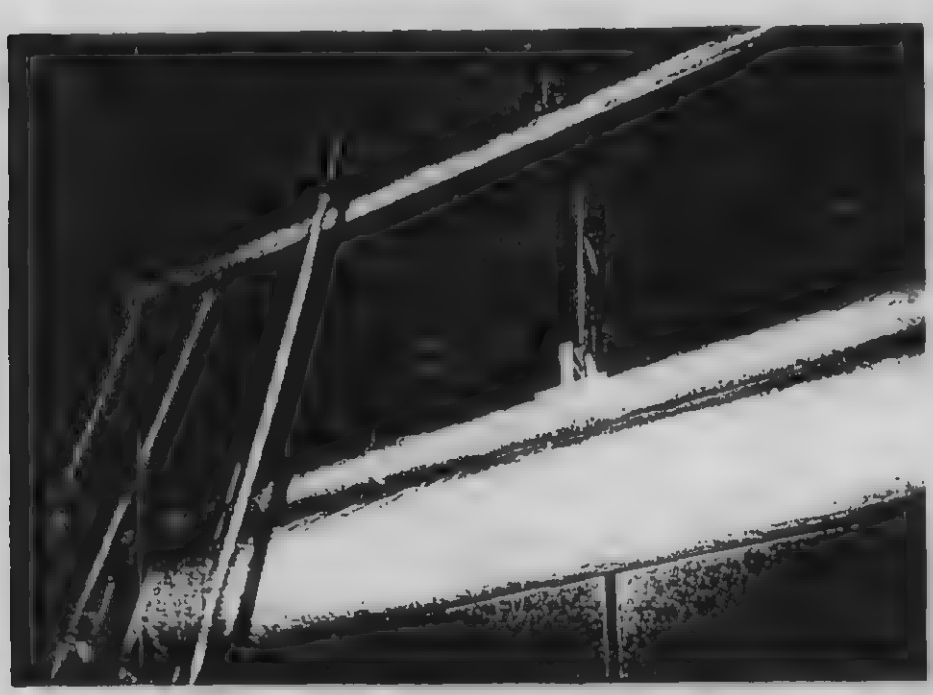
Photograph 1

Entrance pylon at Church Street Plaza entry



Photograph 2

Existing structure at 8th floor below the MER. Spray-applied fireproofing and rigid panel sound insulation are visible

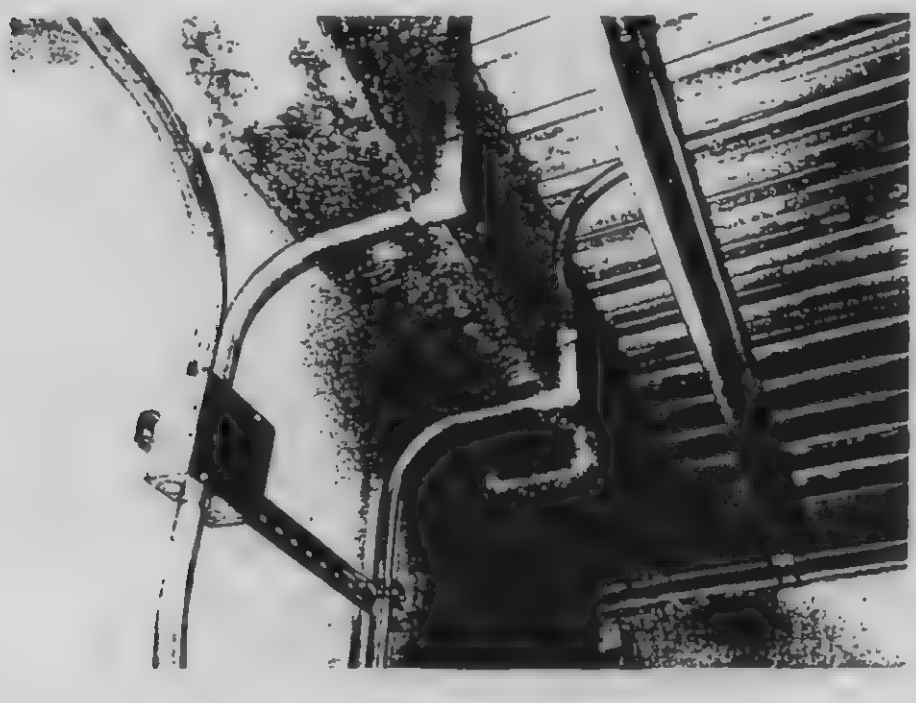


Photograph 3

Roof deck structure with lally-column supports of exterior wall visible at 9th Floor MER

Photograph 4

Roof deck visible at 9th Floor MER Customs House



Photograph 5

Example of spray applied fireproofing removed at framing for attachment of equipment

Photograph 6

Structure of B1 Level at loading docks which also services 4WTC

Photograph 7

East elevation

Photograph 8

Northeast corner from Church and Vesey Streets

Photograph 9

North elevation

Photograph 10

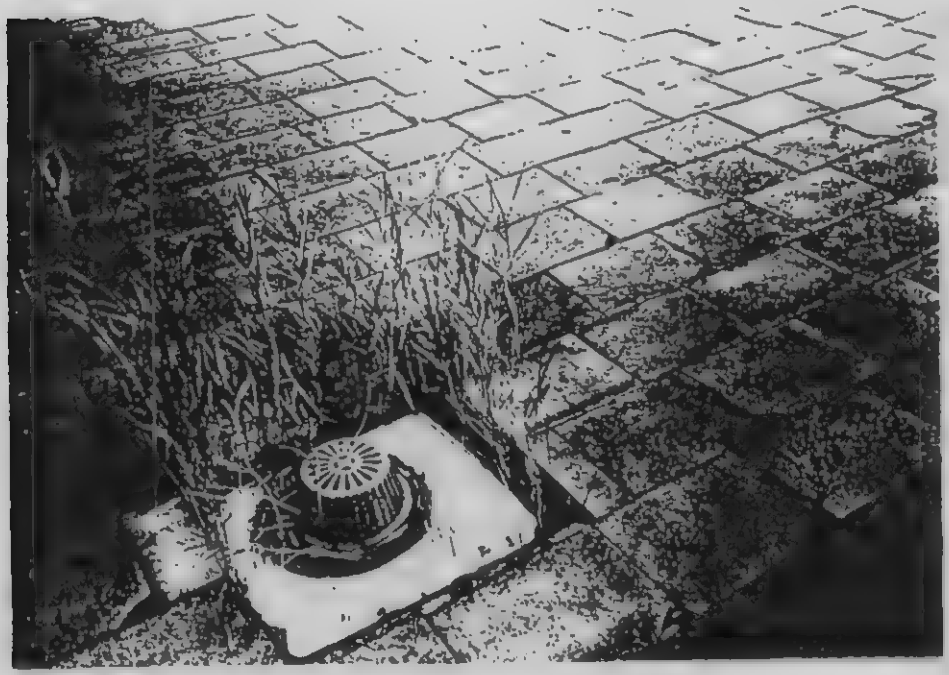
South and west elevations from roof of 4WTC

Photograph 11

Roof layout overview from tower

Photograph 12

Main field of roof with mechanical penthouse, window washing rig track and parapets visible



Photograph 13

Detail of roof drain with vegetation growth supported by the moisture held in paver backing

Photograph 14

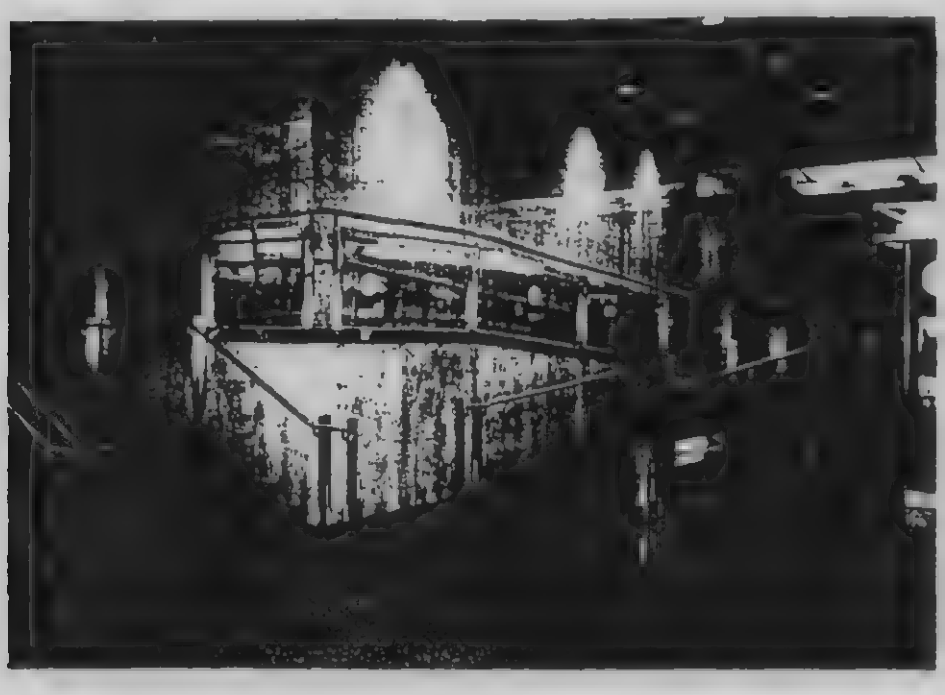
Detail of perimeter flashing detail with vegetation growth

Photograph 15

Penthouse roof with pavers removed for patching of membrane

Photograph 16

Severely rusted underside of roof deck from previous roof leaks



Photograph 17

Concourse level stair and ramp entrance from retail mall

Photograph 18

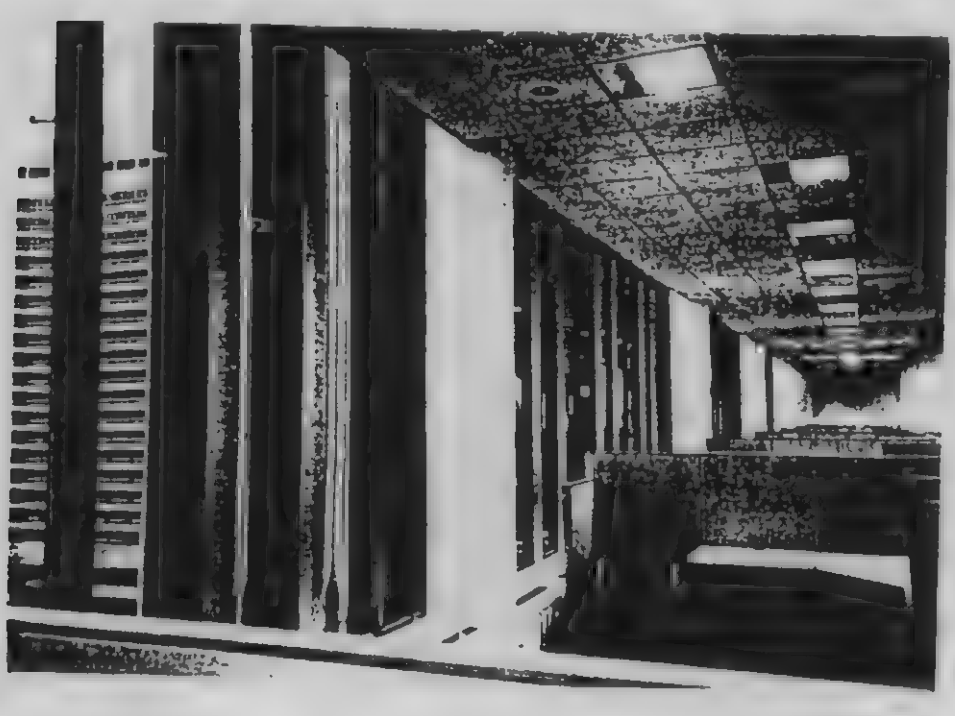
Concourse level entrance

Photograph 19

Plaza level lobby

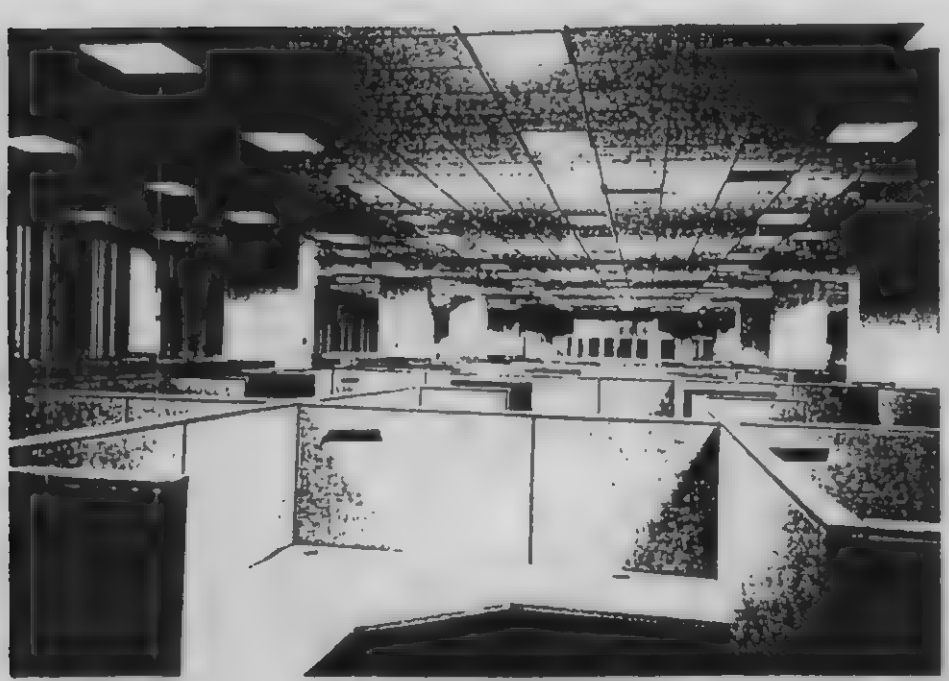
Photograph 20

Office floor corridor finishes



Photograph 21

Office space along window wall

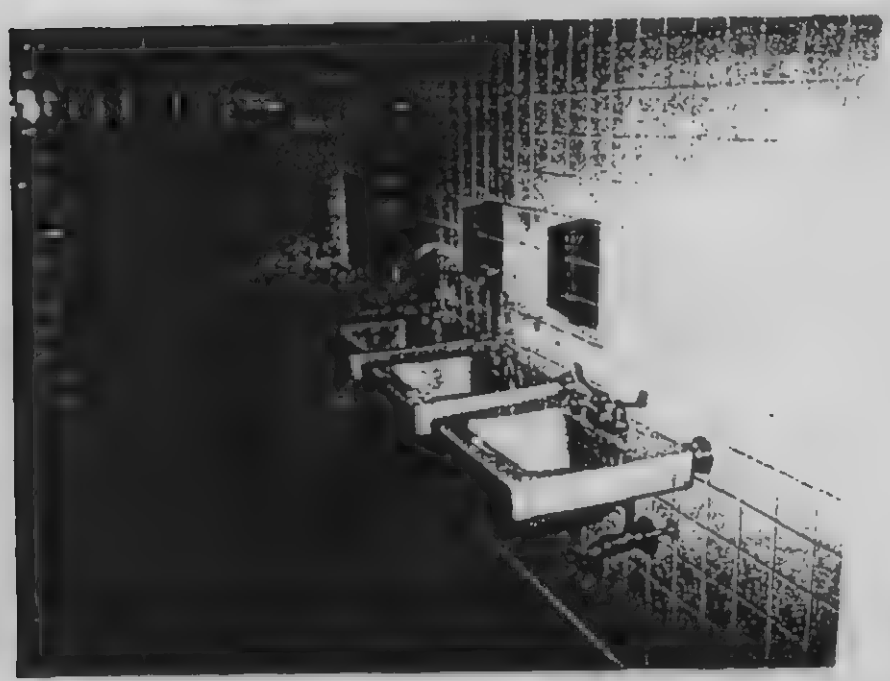


Photograph 22

Representative office space

Photograph 23

Typical rest room finishes

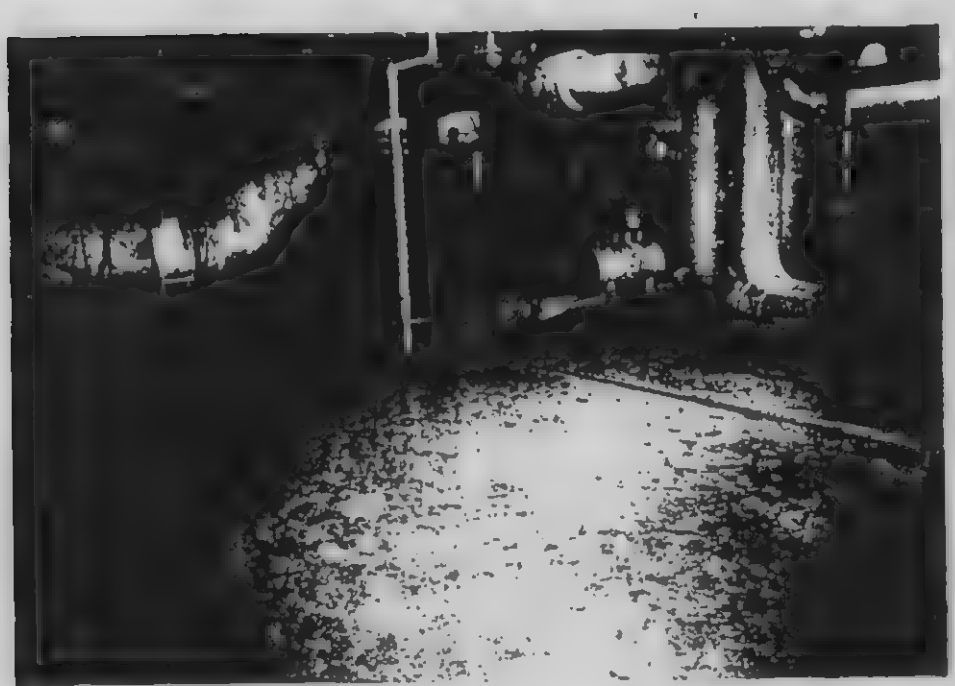


Photograph 24

Typical rest room finishes

Photograph 25

Stairway finishes

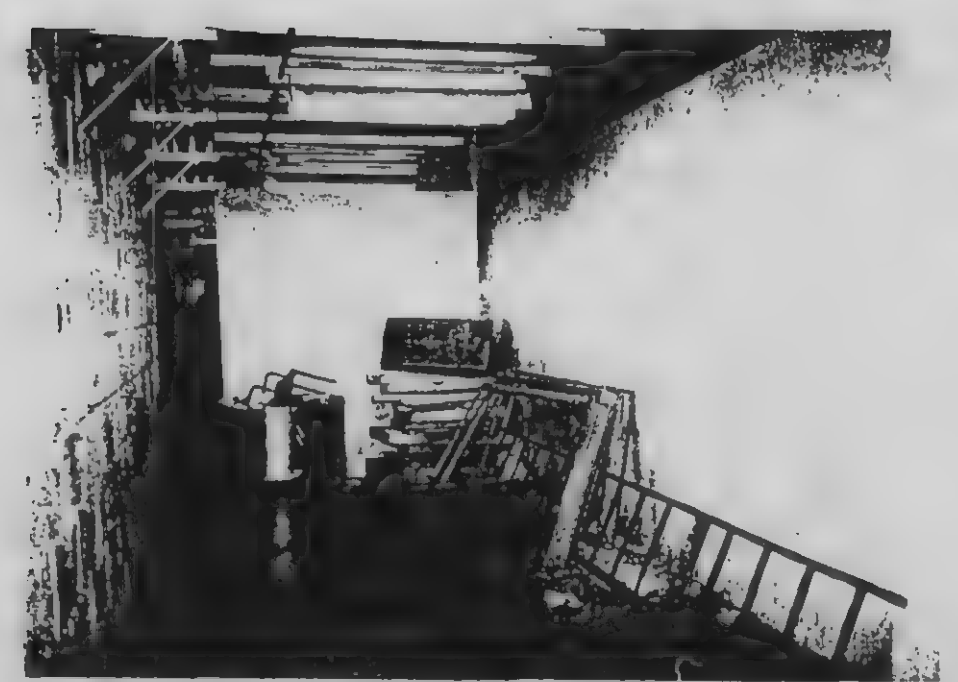


Photograph 26

Mechanical equipment room finishes on 9th floor

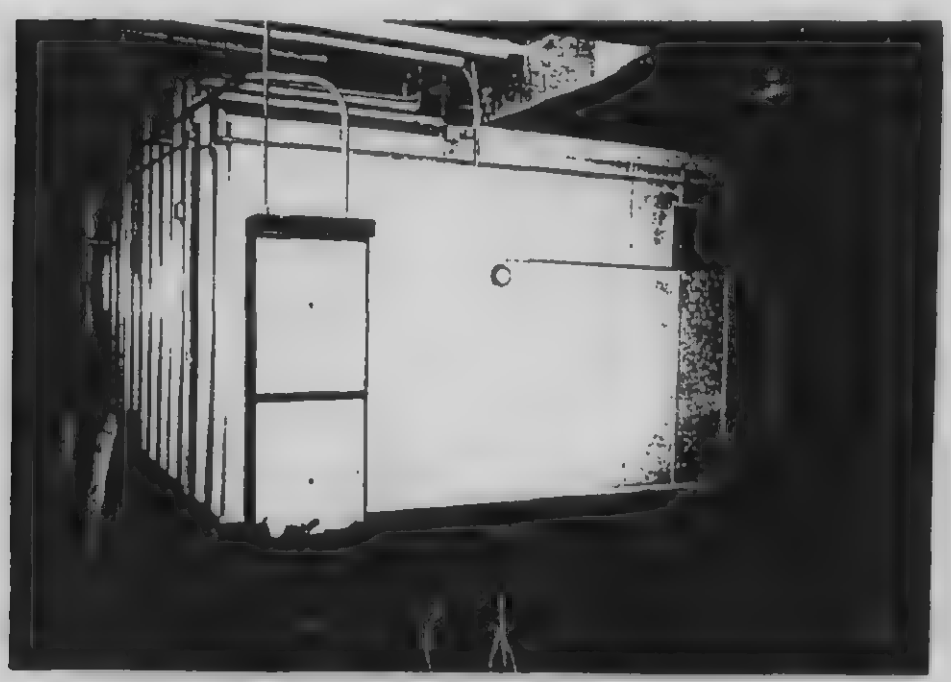
Photograph 27

Freight elevator lobby finishes on 9th floor



Photograph 28

Stored debris blocking corridor on B1 level



Photograph M1

Typical air handling unit located in the 9th floor mechanical

Photograph M2

Chilled water supply line from the central plant

Photograph M3

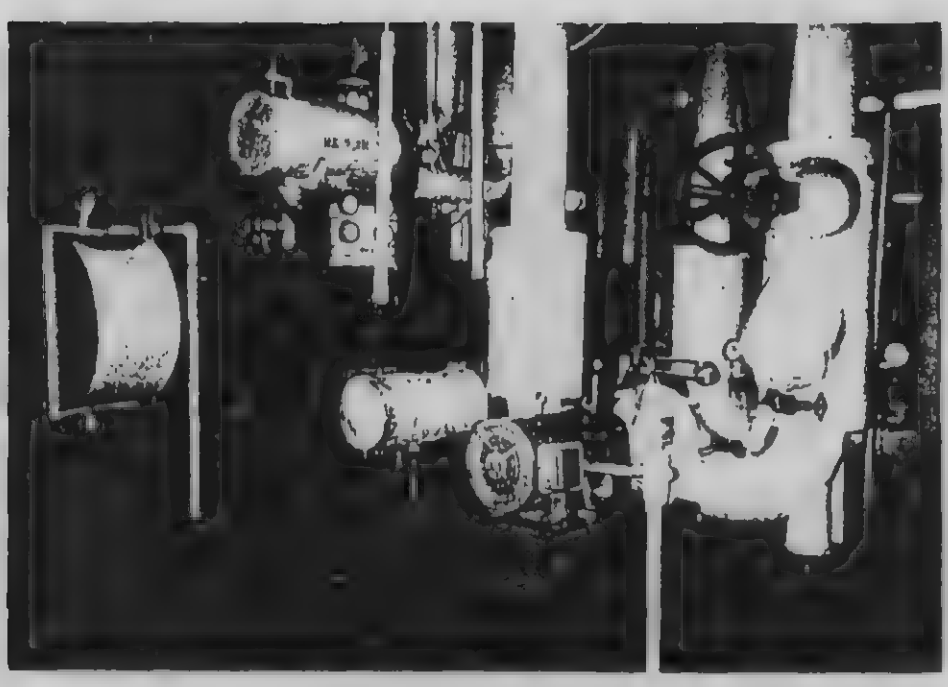
Typical return air fan located in the 9th floor mechanical room

Photograph M4

Steam pressure reducing station

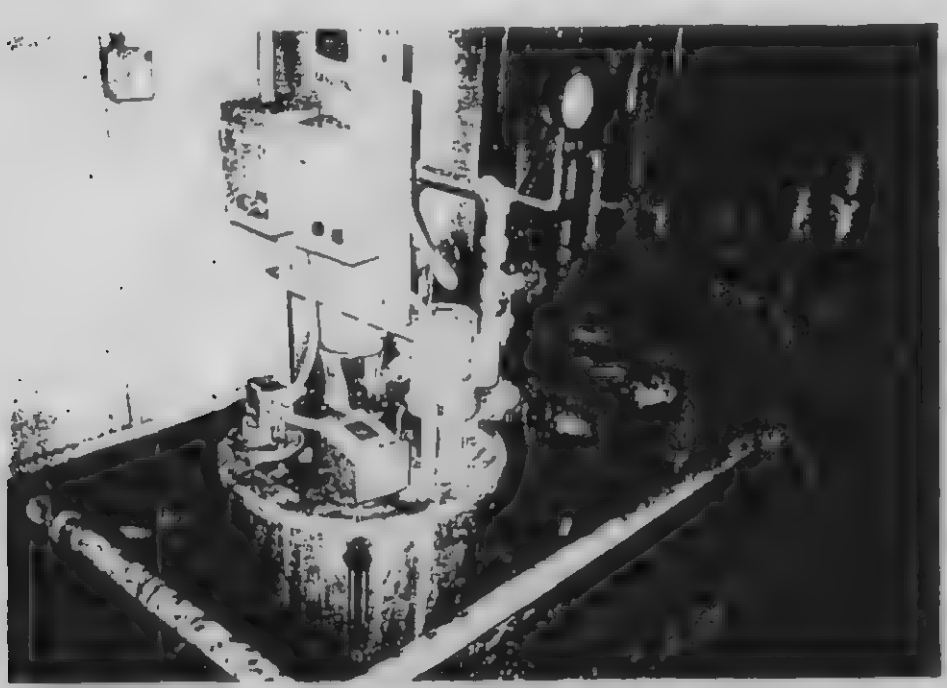
Photograph M5

Secondary chilled/heating hot water pumps located in the 9th floor mechanical



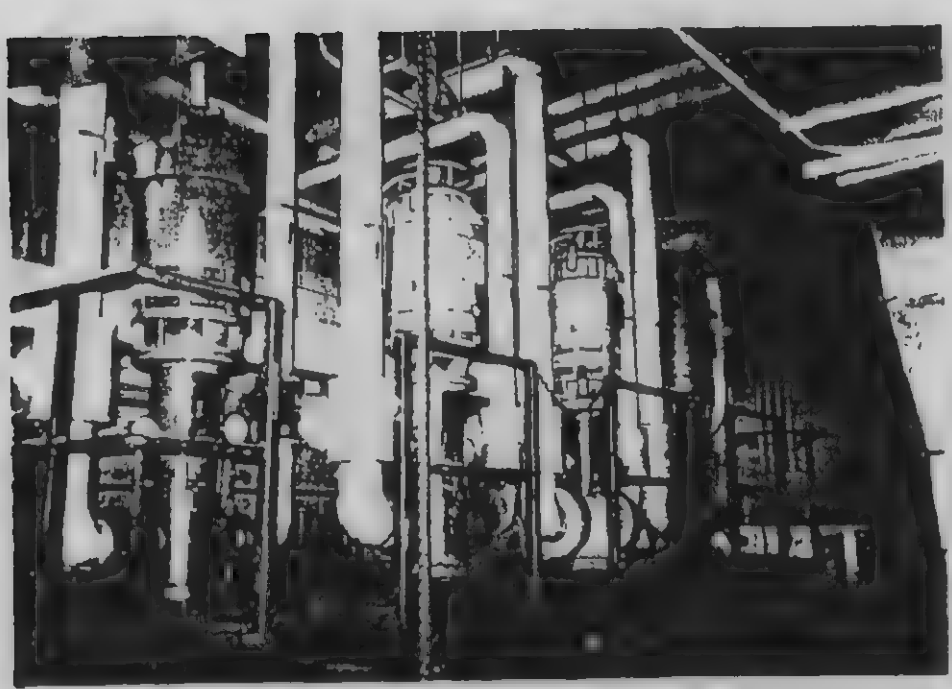
Photograph M6

Heat exchangers and circulating pumps for heating hot water system



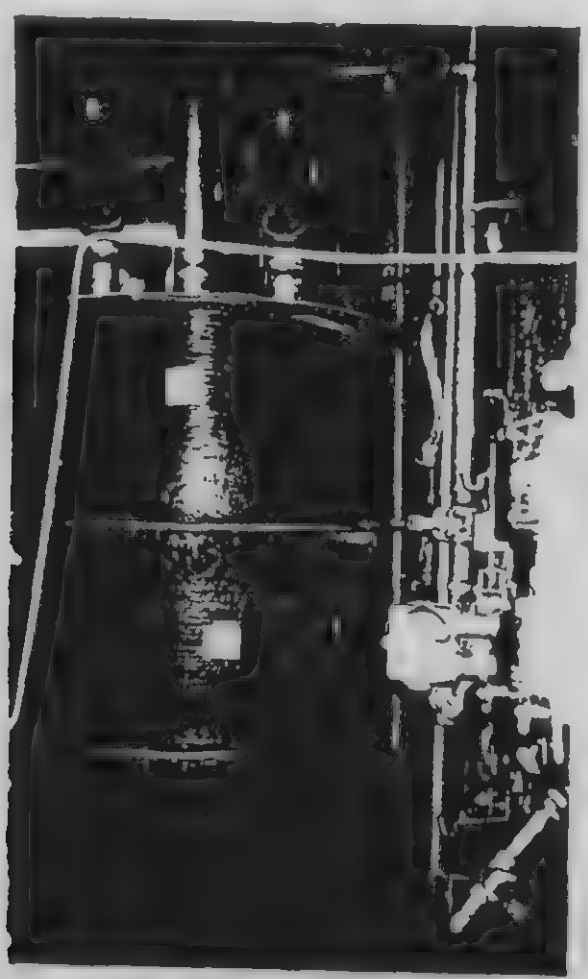
Photograph M7

Steam condensate pumps and receiver



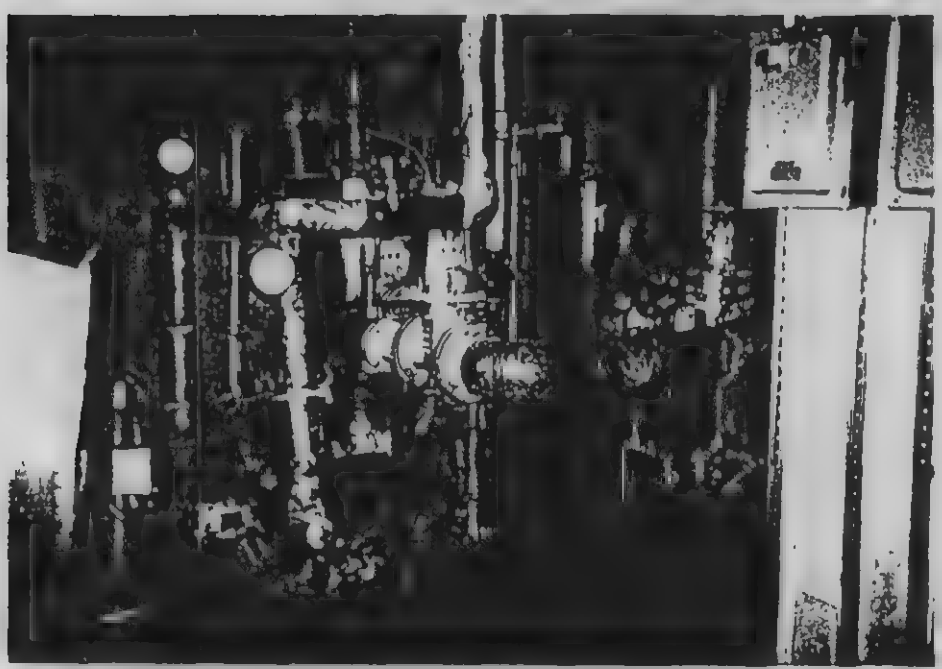
Photograph M8

Domestic water supply pumps



Photograph M9

Ejector pumps and tank



Photograph M10

Steam domestic water heaters and circulating pumps

Photograph M11

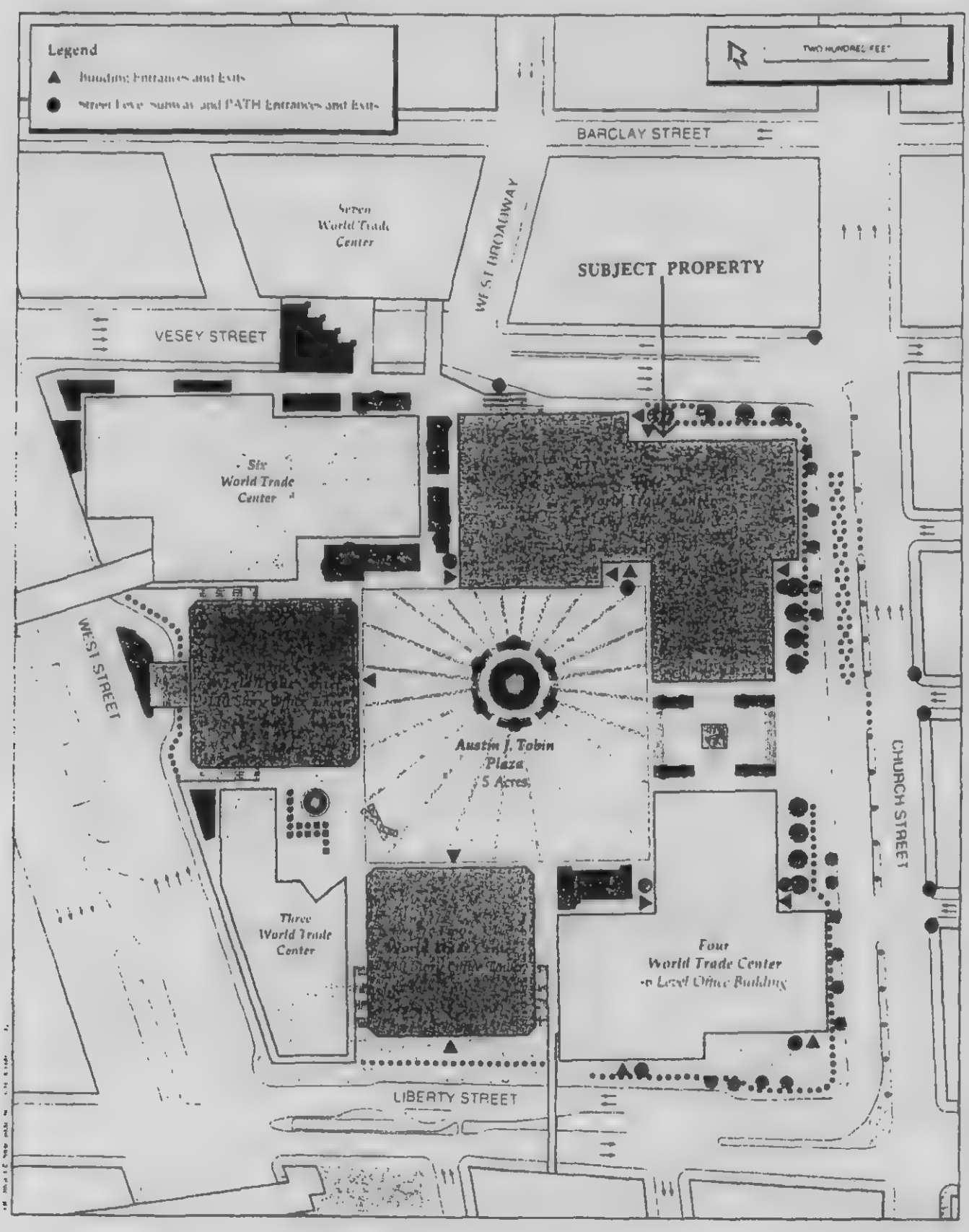
Standpipe riser with sprinkler supply, and flow and tamper switches

Photograph M12

Typical office floor corridor with exit sign, manual pull station, audio/visual alarm, and fire warden station

ATTACHMENT 2

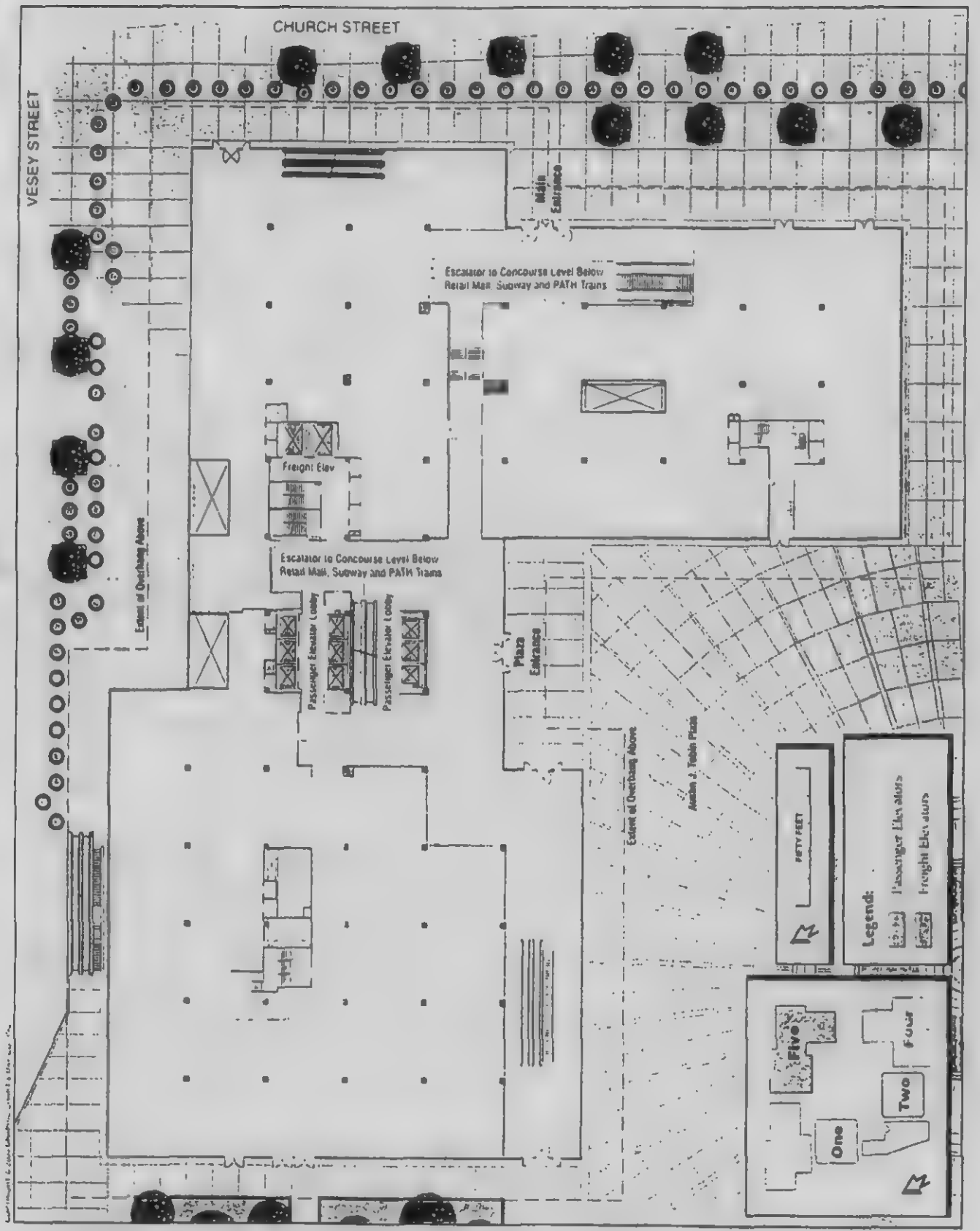
Site Orientation Map
(Reproduced with permission from J.P. Morgan Property Book)


Legend
BARCLAY STREET
Seven World Trade Center
WEST BROADWAY
SUBJECT PROPERTY
VESEY STREET
Six World Trade Center
WEST STREET
Austin J. Tobin Plaza 5 Acres
CHURCH STREET
Three World Trade Center
Four World Trade Center
LIBERTY STREET

ATTACHMENT 3

Lobby floor plan
(Reproduced with permission from J.P. Morgan Property Book)

Five World Trade Center Lobby Floor Plan



ATTACHMENT 4

Typical floor plan
(Reproduced with permission from J.P. Morgan Property Book)

Five World Trade Center Typical Floor Plan

ATTACHMENT 5

Stacking Plan
(Reproduced with permission from J.P. Morgan Property Book)

Five World Trade Center Tenant Stacking Plan

ATTACHMENT 6

BOCA Group International Elevator Survey Report

BOCA GROUP
INTERNATIONAL, INC.
VERTICAL TRANSPORTATION CONSULTING

December 5, 2000

Mr. Robert Weiland
Merritt & Harris, Inc.
110 East 42nd Street
Suite 1200
New York, NY 10017-5685

RE: FIVE WORLD TRADE CENTER
NEW YORK, NY
Vertical Transportation Study

Dear Mr. Weiland:

We are pleased to submit our preliminary report based on a visual inspection performed by our field engineers who visited the above referenced property on and a review of the documents made available to us in the offices of the Port Authority of New York and New Jersey.

OVERVIEW AND LAYOUT

The building is served by nine passenger elevators. Seven of them are driven by SCR drive units (elevators PE1, PE2, PE4-7 and PE9). PE8 is driven by an original Otis motor generator. PE1-PE6 are overhead geared traction machines. PE7 - PE9 are basement underslung geared traction machines. PE3 is in the process of being modernized with an SCR unit and it is overhead geared traction machine. The building also has two freight elevator both driven by motor generators and both overhead geared traction machines..

The building is served by 9 passenger and 2 freight elevators. Elevator 1-6 are overhead geared traction units and cars 7-9 are basement underslung, geared traction units. The freight cars are geared overhead traction units. In addition to the elevators, there are paired escalators that connect levels Mall to 2 to 3, 3 and 4, and 4 and 5 located in the northeast core of the building. Escalators below the 3rd floor are discussed in the retail section of the report.

The speed of elevators PE7 - PE9 has been reduced to 100 Feet Per Minute, due to Code issues regarding inadequate overhead clearance.

In terms of maintenance, most types of repair or replacement of the elevator equipment is covered by the elevator contractor under the maintenance contract. The level of maintenance is average as per industry standards with definite room for improvement.

FIVE WORLD TRADE CENTER
(Pre-selected elevators observed)

ELEVATOR #	FLOORS SERVED	CAPACITY	CONTRACT SPEED (FPM)	FUNCTION
PE7	108	3,500	350 FPM	PASS
PE5	1-9	4,000	350 FPM	PASS
PE10	B1-9	10,000	200 FPM	FREIGHT

ESCALATORS

There are also thirteen (13) escalators serving this building. The following chart describes service provided by these modernized units.

UNIT #	FLOORS SERVED	RISE
E1 & E2	Concourse to Plaza	18' 6"
E3 & E4	Plaza to Lobby	16' 6"
E5 & E6	3 to Plaza	15' 0"
E7 & E8	3-4	12' 0"
E9 & E10	4-5	15" 8"
E11, E12 & E13	Basement Subway to Concourse	14' 6"

EQUIPMENT

ELEVATOR Nos. PE5 & PE7

Is driven by an SCR drive with CEC Swift Futura controller. Machine type is an overhead geared traction.

ELEVATOR NO. FE10

Is driven by original Otis motor generator with original Otis relay type controller. Machine type is overhead geared traction.

ELEVATOR FIVE YEAR TEST

ELEVATOR #	5-YEAR TEST TAG DATE	DATE OF EXPIRATION	STATUS
PE7	1996	2001	CURRENT
PE5	2000	2005	CURRENT
FE10	1999	2004	CURRENT

COMPLIANCE

The elevators have Fire Return Phase I and II. The elevators have emergency power with automatic transfer. The main lines are fused and lockout capable. The two passenger cars are A.D.A. compliant, the safety tests are up to date.

CABS

The two passenger elevator cabs have enamel metal wall panels with marble trim and a laminated canopy. The front of the cabs are brushed stainless steel with two stainless steel car operating panels. L.E.D. position indicator over the door. Fluorescent lighting along the top corners of the cab. Rug floors, emergency lighting, intercom security features and Fire Return Phase II.

The car doors are center opening 42 inches wide. The cars use detector edges for reopening.

The freight elevator cab has metal walls with a metal ceiling and two lights. The floor is diamond plate. There is one car operating panel. The elevator has automatic vertical gate. There is an attendant operating the car at all times.

The car door is a vertical biparting door 93 inches wide with astragals used as the reopening device.

Eight of the eleven elevators have been modernized improving service and creating a more quality ride.

The hoist cables on elevator FE10 are low in the drive sheave which are currently being closely monitored for future repairs. No other major repairs are noted.

ELEVATOR CHART

CAR	BANK	FLOORS SERVED	CAPACITY	SPEED	FUNCTION
PE1 – PE6		1-9	4000 Pounds	350 Feet Per Minute	Passenger
PE7 – PE9		1-8	3500 Pounds	350 Feet Per Minute	Passenger
FE10 & FE11	Freight	B1 - 9	10,000 Pounds	200 Feet Per Minute	Freight

Note: PE7 - PE9: The speed of these three elevators has been reduced to 100 Feet Per Minute, due to Code issue regarding inadequate overhead clearance.

Sincerely,

BOCA Group International, Inc.

Robert Wernon
Field Engineer
FIVE World Trade Ctr Vert Trans Study 11-1-00.doc

BOCA GROUP
INTERNATIONAL, INC.
VERTICAL TRANSPORTATION CONSULTING

December 5, 2000

Mr. Robert Weiland
Merritt & Harris, Inc.
110 East 42nd Street
Suite 1200
New York, NY 10017-5685

Re: **WORLD TRADE CENTER**
NEW YORK, NY
Buildings Five
Theoretical Traffic Analysis

Dear Mr. Weiland:

The following are the criteria and calculated results of our calculated elevator traffic analysis for Five World Trade Center:

CRITERIA

The following are the criteria used to analyze elevator traffic capabilities:

- **Maximum Five-minute Handling Capacity (# of People):** This is the approximate maximum number of passengers the elevator system can be expected to serve during a five-minute peak period. For a bank of elevators serving commercial office space, this should be no less than 10% to 12% of the total population this bank is expected to serve.

- **Maximum Five-minute Handling Capacity (% of Population):** This is the percentage of the total expected population served by the elevator bank represented by the maximum five-minute handling capacity. For a bank of elevators serving commercial office space, this should be no less that 10% to 12

- **Average Interval:** This is the average time interval between elevators passing a given floor in a particular direction during a peak period, assuming the elevators are evenly spaced throughout the building. Note that Average Interval is a design criteria, and is NOT the same as the "average waiting time", which cannot be directly calculated by theoretical means. For a bank of elevators serving commercial office space, the average interval should be no more than 35 to 45 seconds.

200 PARK AVENUE • NEW YORK, NY 10166
TELEPHONE (212) 983-7010 • FAX (212) 983-7011 • E-MAIL info@bocagroup.com
www.bocagroup.com

CALCULATED RESULTS

The estimated population values shown in the tables below were derived by assuming 80% of the total floor area is usable, and that there is one person per 200 square feet of usable space.

The calculations were also performed assuming that the office space being served by these elevators begins on the 4th floor.

ELEVATOR BANK	ELEVATOR NUMBERS	ESTIMATED POP.	MAXIMUM FIVE-MINUTE HANDLING CAPACITY (# of People)	MAXIMUM FIVE-MINUTE HANDLING CAPACITY (% of Population)	AVERAGE INTERVAL (seconds)
LOW	PE7-PE9	500	153	31%	33
		TARGET:	**> 50-60**	**10-12%**	**< 35-45**
HIGH	PE1-PE6	1890	311	16%	29
		TARGET:	**> 189-227**	**10-12%**	**< 35-45**

The preceding chart shows that the elevators at Five World Trade Center should provide good service during peak traffic periods when there is a full population in the building. The maximum handling capacity and the average intervals are all better than the required criteria for acceptable service.

Should you have any questions or should you need any clarifications on our report, please feel free to contact us. Thank you.

Sincerely,

BOCA GROUP INTERNATIONAL, INC.

Daniel DeBlasio

Daniel DeBlasio
Director of Engineering
World Trade Center - 5 Traffic Analysis.doc

ATTACHMENT 7

Crandlemere and Associates Asbestos-Containing Materials
Document Review & Evaluation

R. W. CRANDLEMERE & ASSOCIATES, INC.
PROTECTING BUSINESS AND THE ENVIRONMENT

ASBESTOS-CONTAINING MATERIALS

DOCUMENT REVIEW AND EVALUATION

FIVE WORLD TRADE CENTER

NORTHEAST PLAZA BUILDING

NEW YORK CITY, NY 10081

Project #000095

Merritt & Harris, Inc. #20-251E

User:

Merritt & Harris, Inc.
Attn: Mr. Robert G. Weiland, V. P.
110 East 42nd Street, 12th Floor
New York City, NY 10017-5685

Date Issued: November 7, 2000

549 Columbian Street, Suite 305, Weymouth, MA 02190 Tel. (781) 340-6161 Fax (781) 340-9191

The Asbestos-Containing Materials Document Review and Evaluation described herein was conducted by the undersigned, of R. W. Crandlemere & Associates, Inc. (CRANDLEMERE & ASSOCIATES). CRANDLEMERE & ASSOCIATES assessment consisted solely of the activities described in the Introduction of this report. The assessment was conducted in accordance with the Scope of Work in our Proposal No 00-090. It is subject to the Limitations and Service Constraints as provided in Appendix A of our ASTM Phase I Environmental Site Assessment report prepared as part of this Project. See Appendix F of that report for ASTM definition of terms in italics in this report

Report Prepared by:

R. Wayne Crandlemere
President

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1.0 INTRODUCTION 1

1.1 Background
1.2 Scope of Work

2.0 SUMMARY OF REVIEW OF DOCUMENTS 4

APPENDICES

Appendix A Back Up Documentation
Appendix B Photographs

1.0 INTRODUCTION

R. W. Crandlemere & Associates, Inc. (CRANDLEMERE & ASSOCIATES) was retained by Merritt & Harris, Inc. (the *user*) to conduct an ASTM E1527-97 Phase I *Environmental Site Assessment* (ESA) of One, Two, Four and Five World Trade Center, located in the Borough of Manhattan, New York City, New York, 10081.

It is our understanding that Merritt & Harris, Inc. is providing this information in conjunction with, and as part of, a larger assessment of the *property* and has named The Port Authority of New York and New Jersey as an *additional user* as defined by the ASTM Standard E1527-97 Section 3.3.39. As an *additional user*, The Port Authority of New York and New Jersey may rely on the information presented in this report.

This report presents CRANDLEMERE & ASSOCIATES' professional opinion, and no warranty, expressed or implied, is made. The Port Authority of New York and New Jersey has the right to reproduce in full and provide copies of this report to interested parties. All reports, both verbal and written, are for the benefit of The Port Authority of New York and New Jersey and its' agents, employees, participates, and assigns.

On September 26, 27, 28 and 29 and October 10 and 11, 2000 Mr. R. Wayne Crandlemere of CRANDLEMERE & ASSOCIATES conducted a *Site visit* to identify *recognized environmental conditions* at the Site. In addition, CRANDLEMERE & ASSOCIATES' assessment included reconnaissance of adjacent properties, background research, and review of available local, state and federal regulatory records regarding the presence of petroleum products or hazardous materials at or in the vicinity of the Site.

The results of our work regarding the ASTM Standard for a Phase I Environmental Site Assessment of the Site is provided in a separate Phase I ESA report.

This report addresses the asbestos-containing materials (ACM) related to the Five World Trade Center, Northeast Plaza Building (including elevator, façade, and asbestos issues for this building). The Five World Trade Center building is defined by the Offering Memorandum as office floors 4-9. See the separate reports specifically related to the One World Trade Center, Two World Trade Center, Four World Trade Center, Retail Mall and Plaza, Central Services and Subgrade for ACM information specific to those buildings and facility areas.

1.1 Background

The World Trade Center was constructed between 1966 and 1970 when asbestos was used in buildings as a fire retardant. According to the World Trade Center Property Book (see Section 3.4), "sprayed on asbestos is present within the 6th floor catwalks, mezzanine substructure, elevator shafts and machine rooms, interior core pipe chases, and electric and phone closets of the Twin Tower buildings. Additionally, asbestos-containing thermal system pipe insulation is present in pipe chases, the Concourse ceiling plenum and in MERs [mechanical equipment rooms], while vinyl asbestos floor tiles are present throughout the complex. The Port Authority has removed a large portion of the asbestos

material typically located on the structural columns and on pipe insulation from tenant floors in One World Trade Center, and has removed much of the pipe wrap insulation found in the Subgrade. The practice of containment has not been implemented at the World Trade Center."

"In addition to full-scale abatement projects, the World Trade Center has instituted an ongoing operations and maintenance program whereby specific individuals on the staff are trained as certified ACM handlers and can respond with appropriate equipment and procedures to manage incidental ACM incidents. Tenants whose space may contain ACM have been formally notified."

1.2 Scope of Work

Beyond the Scope of Work for the ASTM Standard for a Phase I Environmental Site Assessment, but as required by the *user*, summaries of readily available information (provided by and apparently prepared by the Port Authority of New York and New Jersey) pertaining to the presence of asbestos-containing building materials (ACBM) and documentation of the work done to abate ACBM was evaluated. No sampling or analysis was included and this is not to be interpreted as a complete asbestos survey.

Please note: There is reported litigation in progress for cost-recovery of money related to ACM abatement and/or management. This litigation was not evaluated as part of this assessment and the *user* should consider a detailed review of the on-going litigation and make their own determination as to the impact, if any, on their use of this report and/or future impact of the litigation on their decision making process related to the World Trade Center. Further, the information presented in this report is based at least in part on a somewhat arbitrary separation of areas of the complex that may or may not have any basis in the current operation of the Complex as it is currently managed as one facility. The *user* should consider this report as a good faith effort to present ACM related information to the subject area, however, the *user* is encouraged to review the ACM related Section of the Phase I Environmental Site Assessment (ESA) report which provides a summary of all ACM related information provided by the *owner*. Included in Appendix H-7 of the ESA report are copies of the asbestos program highlights as presented in the World Trade Center Environmental Programs 1999 Year End report. This includes a summary of 1999 Asbestos Projects, World Trade Center Asbestos Disclosure, World Trade Center Elevator Shaft Asbestos Assessment, and World Trade Center Asbestos Contract Administration procedures. Portions of those documents are included in this report. Additionally, the *user* should consider an independent review of the information provided.

It should also be noted that certain materials such as fire doors were not included in the materials suspected to be asbestos-containing and have not been tested or otherwise investigated. It was reported that testing of spline ceilings, hung ceilings, wallboard and wallboard joint compound determined that they were not ACM throughout the facility. A review of test results was not performed and we cannot verify the adequacy of such testing. The *user* may wish to further investigate such materials.

There have been significant on-going asbestos abatement projects and cost estimates provided by the *owner* indicate the following estimated removal costs:

Material	Removal Cost
Vinyl asbestos tile (VAT)	$ 5-6/square foot
Sprayed-on Fireproofing	$20-25/square foot
Thermal System Insulation (TSI)	$15/linear foot

The actual costs for VAT removal for 1999 projects are provided in Appendix H-7 of the Phase I ESA report.

Documentation regarding the presence of ACM in elevator shafts is presented by shaft designation. It is unclear where the shafts are located within the facility and the *user* should consider cross-referencing the shaft locations to the area under consideration. Mr. Taylor reported that there are forty (40) shafts that contain ACM within the Center.

2.0 SUMMARY OF DOCUMENTS REVIEWED

Information provided reports:

There is no asbestos-containing sprayed-on fireproofing in Five World Trade Center. Non-asbestos-containing spray-on fireproofing is present (Photos #1 & 2).

Thermal system insulation (TSI) is present, however, the quantity is unknown.

There is a "Cementitious patch of less than 160 square feet on a beam... on the 5th floor...."

ACM may be present in elevator shafts.

ACM has been removed from the roof.

There is no ACM in mechanical rooms.

There is 167,515 square feet of vinyl asbestos tile (VAT) remaining.

APPENDIX A

5 WTC

Excluding MERs, Truckdock, Subgrades, and Elevator Shafts

Location	Floors	Amount

There is no sprayed-on fireproofing in 4 WTC.

Thermal system insulation is in the form of pipe saddles in 4 WTC. Quantities not determined.

A cementitious patch of less than 160 sqft exists on a beam in the south wing of the southwest portion of the 5th floor in 5 WTC.

WILL INCLUDE VAT FIGURES

THE PORT AUTHORITY OF NY & NJ MEMORANDUM

TO: Joseph Amatuccio, Carla Bonacci, Jerrold Dinkels, Frank DiMartini, Eric Hauser, Louis Menno, Edwin Monteverde, Francis Riccardelli, Nancy Seliga

FROM: John Castaldo

DATE: September 19, 2000

SUBJECT: **ASBESTOS POSITIVE LOCATIONS AT THE WORLD TRADE CENTER: UPDATE.**

REFERENCE: J. Castaldo to Addressees; Memorandums Dated 5/4/98 and 12/21/99; Same Subject.

COPY: L. Ardizzone, S. Benjamin, I. Chachkes, J. Connors, W. Devlin, M. Finegold, M. Hurley, M. Jakubek, M. Kirshner, T. Lynch, U. Mehta, G. Meyer, R. Muessig, C. Nanninga, A. Reiss, E. Strauss, G. Tabek, P. Taylor, F. Varriano, L. Zucchi, Operations Control Desk, S-4's

Attached please find an update to my initial May, 1998 memorandum wherein the known asbestos locations at the World Trade Center were disclosed. The information provided in this disclosure is a compulation of avaliable bulk sampling and analytical results from both the World Trade and Engineering Departments' data bases.

In compliance with the disclosure requirements of the U.S. Occupational Safety and Health Administration's asbestos standard, I am requesting that this information be distributed to all World Trade Department, Engineering Department, PA Office Space, and Leasing Division property managers, project managers, construction managers, construction inspectors, operations supervisors, security supervisors, facility maintanence supervisors, and leasing agents associated with the allocation of space, and the design and implementation of World Trade Center projects. Additionally, please forward this information to those contractors under your administration. If there are questions as to the presence of asbestos-containing materials at a particular location, or if the scope of demolition and/or renovation work may impact asbestos-containing materials, please contact Art Burton, Assistant Environmental Coordinator, at 435-8364.

Those on the copyline are requested to contact this office for the appropriate response action if asbestos-containing materials may be impacted by work under your jurisdiction. The Port Authority complies with Industrial Code Rule #56 relative to worker certifications, contractor licensing, and work procedures if asbestos is going to be disturbed or impacted. Please contact me at 435-8518 should you have any questions.

John Castaldo
General Manager,
Base Building Services

Asbestos-Containing Surfacing And/Or Thermal System Insulation Materials Located In Four And Five World Trade Center

There is no asbestos-containing sprayed-on fireproofing in Four and Five World Trade Center.
A cementitious patch has been identified on a beam in the south wing of the southwest portion on the 5th floor in 5 WTC.
Thermal system insulation is present in the form of pipe saddles.

Asbestos-Containing Surfacing And/Or Thermal System Insulation Materials Located On The Concourse

There is no asbestos-containing sprayed-on fireproofing in the plenum of the Concourse.
Thermal system insulation material is present.
ACM

Asbestos-Containing Surfacing And/Or Thermal System Insulation Materials Located On The B1 Level And The Truckdock

Asbestos-containing sprayed-on fireproofing and thermal system insulation material is present.

Miscellaneous Asbestos-Containing Materials At The World Trade Center

Base building flooring throughout the facility is vinyl asbestos floor tile (VAT).

Asbestos-Containing Surfacing And Thermal System Insulation Materials Located In Four And Five World Trade Center

There is no asbestos-containing sprayed-on fireproofing in Four and Five World Trade Center.
Thermal system insulation is present in the form of pipe saddles.

Asbestos-Containing Surfacing And Thermal System Insulation Materials Located On The Concourse

There is no asbestos-containing sprayed-on fireproofing in the plenum of the Concourse.
There is thermal system insulation material present.
ACM

Asbestos-Containing Surfacing And Thermal System Insulation Materials Located On The B1 Level And The Truckdock

Asbestos-containing sprayed-on fireproofing and thermal system insulation material is present

Miscellaneous Asbestos-Containing Materials At The World Trade Center

Base building flooring throughout the facility is vinyl asbestos floor tile (VAT).

ACBM is located behind the convector units at the following locations:
1 WTC; 77, 79, 88, 101, 103 and 105.
2 WTC; 22, 24, 59, 72, 79, 81, 84, 86 and 87.

THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

MEMORANDUM

TO: Phil Taylor-Supervising Engineer.

FROM: Pete Negron

DATE: July 21, 1999

SUBJECT: **Elevator Shaft Asbestos Assessment.**

REFERENCE: **Attached E-Mail**

COPY TO: J. Amatuccio, D. Bobbitt, A. Burton, J. Castaldo, F. Riccardelli, L. Zucchi.

During the week of July 21, 1999, I inspected the elevator shafts to assess the condition of the fireproofing on the steel members.

The attached report includes the shaft number, floor and condition of fireproofing: intact or delaminated, and recommended action.

Floors not listed were inspected and found to be acceptable in that the fireproofing was intact.

In summary, of the 22 shafts inspected, shafts, which require full-scale abatement, are shafts 22/23A, 10B and 48B.

If you require further information regarding this report please contact me at 1.212.435.8364.

Pete Negron
Associate Environmental Analyst
Operations & Maintenance Management
World Trade Center

Attachment

WORLD TRADE CENTER
ELEVATOR SHAFTS ASBESTOS ASSESSMENT

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
25	1A	NO	YES	24 S.F.	SEAL EDGES
26	1A	NO	YES	12 S.F.	SEAL EDGES
27	1A	NO	YES	30 S.F.	SEAL EDGES
28	1A	NO	YES	12 S F.	SEAL EDGES
29	1A	NO	YES	48 S.F.	SEAL EDGES
SPRAY-ON MATERIAL					

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
9	2A	NO	YES	24 S.F.	SEAL EDGES
27	2A	NO	YES	4 S.F.	SEAL EDGES
28	2A	NO	YES	4 S.F.	SEAL EDGES
29	2A	NO	YES	4 S.F.	SEAL EDGES
30	2A	NO	YES	24 S.F.	SEAL EDGES
31	2A	NO	YES	24 S.F.	SEAL EDGES
34	2A	NO	YES	36 S.F.	SEAL EDGES
38	2A	NO	YES	6 S.F.	SEAL EDGES
SPRAY-ON MATERIAL					

2A

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
310	3A	NO	YES	72 S.F.	SEAL EDGES
5	3A	NO	YES	34 S.F.	SEAL EDGES
8	3A	NO	YES	48 S.F.	SEAL EDGES
9	3A	NO	YES	48 S.F.	SEAL EDGES
16	3A	NO	YES	30 S.F.	SEAL EDGES
17	3A	NO	YES	48 S.F.	SEAL EDGES
18	3A	NO	YES	48 S.F.	SEAL EDGES
19	3A	NO	YES	72 S F	SEAL EDGES
23	3A	NO	YES	48 S F.	SEAL EDGES
34	3A	NO	YES	72 S F.	SEAL EDGES
40	3A	NO	YES	6 S F.	SEAL EDGES
SPRAYED-ON MATERIAL					

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
ALL	4A	YES	NO	NONR	NONE
CEMENTITIOUS MATERIAL					

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
ALL	5A	YES	NO	NONE	NONE
ALL	48A	YES	NO	NONE	NONE
CEMENTITIOS MATERIAL					

Note Delamination is fireproofing whether sprayed or troweled no longer present on the steel members

1

WORLD TRADE CENTER
ELEVATOR SHAFTS ASBESTOS ASSESSMENT

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
22	8A	NO	YES	72 S.F.	SEAL EDGES
33	8A	NO	YES	48 S.F.	SEAL EDGES
36	8A	NO	YES	4 S.F.	SEAL EDGES
38	8A	NO	YES	48 S.F.	SEAL EDGES
39	8A	NO	YES	48 S.F.	SEAL EDGES
SPRAY-ON MATERIAL					

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
7	9A	NO	YES	2 S.F.	SEAL EDGES
13	9A	NO	YES	2 S.F.	SEAL EDGES
24	9A	NO	YES	3 S.F.	SEAL EDGES
31	9A	NO	YES	4 S.F.	SEAL EDGES
34	9A	NO	YES	6 S.F.	SEAL EDGES
36	9A	NO	YES	6 S.F.	SEAL EDGES
39	9A	NO	YES	48 S.F.	SEAL EDGES
41	9A	NO	YES	48 S.F.	SEAL EDGES
43	9A	NO	YES	48 S.F	SEAL EDGES
SPRAYED-ON MATERIAL					

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
9	15A	NO	YES	24 S.F	SEAL EDGES
25	16A	NO	YES	18 S.F.	SEAL EDGES
26	16A	NO	YES	28 S.F	SEAL EDGES
27	16A	NO	YES	48 S.F	SEAL EDGES
28	16A	NO	YES	24 S.F.	SEAL EDGES
CEMENTITIUOS MATERIAL					

FLOORS	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
ALL	17A	YES	NO	NO	NONE

FLOORS	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
ALL	18A	X	NO	NONE	NONE

Note Delamination is fireproofing whether sprayed or troweled no longer present on the steel members

WORLD TRADE CENTER
ELEVATOR SHAFTS ASBESTOS ASSESSMENT

FLOOR	SHAFT 1 WTC	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
8	19A	NO	YES	16 S.F.	SEAL EDGES
10	19A	NO	YES	24 S.F.	SEAL EDGES
11	19A	NO	YES	24 S.F.	SEAL EDGES
19	19A	NO	YES	48 S.F.	SEAL EDGES
25	19A	NO	YES	48 S.F.	SEAL EDGES
26	19A	NO	YES	48 S.F.	SEAL EDGES
28	19A	NO	YES	24 S.F.	SEAL EDGES
30	19A	NO	YES	24 S.F.	SEAL EDGES
32	19A	NO	YES	2 S.F.	SEAL EDGES
CEMENTITIOUS MATERIAL					

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
8	20A	NO	YES	12 S.F.	SEAL EDGES
10	20A	NO	YES	3 S.F.	SEAL EDGES
22	20A	NO	YES	3 S.F.	SEAL EDGES
23	20A	NO	YES	3 S.F.	SEAL EDGES
25	20A	NO	YES	36 S.F.	SEAL EDGES
26	20A	NO	YES	34 S.F	SEAL EDGES
27	20A	NO	YES	26 S F.	SEAL EDGES
28	20A	NO	YES	30 S.F.	SEAL EDGES
29	20A	NO	YES	28 S.F.	SEAL EDGES
SPRAYED-ON MATERIAL					

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
310	21A	NO	YES	24 S F.	SEAL EDGES
2	21A	NO	YES	24 S F.	SEAL EDGES
3	21A	NO	YES	24 S F.	SEAL EDGES
9	21A	NO	YES	24 S F.	SEAL EDGES
23	21A	NO	YES	24 S F.	SEAL EDGES
29	21A	NO	YES	48 S F.	SEAL EDGES
32	21A	NO	YES	6 S F	SEAL EDGES
SPRAYED-ON MATERIAL					

Note. Delamination is fireproofing whether sprayed or troweled no longer present on the steel members

WORLD TRADE CENTER
ELEVATOR SHAFTS ASBESTOS ASSESSMENT

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
3	22A	NO	YES	4 S.F.	SEAL EDGES
4	22A	NO	YES	4 S.F.	SEAL EDGES
5	22A	NO	YES	4 S.F.	SEAL EDGES
6	22A	NO	YES	4 S.F.	SEAL EDGES
7	22A	NO	YES	4 S.F.	SEAL EDGES
8	22A	NO	YES	4 S.F.	SEAL EDGES
9	22A	NO	YES	4 S.F.	SEAL EDGES
10	22A	NO	YES	4 S.F.	SEAL EDGES
11	22A	NO	YES	4 S F.	SEAL EDGES
12	22A	NO	YES	4 S F.	SEAL EDGES
13	22A	NO	YES	4 S.F.	SEAL EDGES
14	22A	NO	YES	6 S.F.	SEAL EDGES
15	22A	NO	YES	4 S.F.	SEAL EDGES
16	22A	NO	YES	12 S.F.	SEAL EDGES
18	22A	NO	YES	6 S.F.	SEAL EDGES
19	22A	NO	YES	6 S.F.	SEAL EDGES
20	22A	NO	YES	6 S.F.	SEAL EDGES
21	22A	NO	YES	6 S.F.	SEAL EDGES
22	22A	NO	YES	6 S.F.	SEAL EDGES
23	22A	NO	YES	6 S.F.	SEAL EDGES
24	22A	NO	YES	6 S.F.	SEAL EDGES
25	22A	NO	YES	6 S.F.	SEAL EDGES
26	22A	NO	YES	8 S F	SEAL EDGES
27	22A	NO	YES	6 S F.	SEAL EDGES
28	22A	NO	YES	48 S F	SEAL EDGES
29	22A	NO	YES	6 S.F	SEAL EDGES
30	22A	NO	YES	6 S.F.	SEAL EDGES
31	22A	NO	YES	6 S F	SEAL EDGES
32	22A	NO	YES	6 S.F.	SEAL EDGES
33	22A	NO	YES	6 S F.	SEAL EDGES
34	22A	NO	YES	6 S F	SEAL EDGES
35	22A	NO	YES	4 S F	SEAL EDGES
36	22A	NO	YES	8 S F	SEAL EDGES
37	22A	NO	YES	6 S F	SEAL EDGES
38	22A	NO	YES	6 S F	SEAL EDGES
39	22A	NO	YES	24 S F	SEAL EDGES
40	22A	NO	YES	8 S F	SEAL EDGES
41	22A	NO	YES	8 S F.	SEAL EDGES
42	22A	NO	YES	8 S F.	SEAL EDGES
43	22A	NO	YES	8 S F	SEAL EDGES
44	22A	NO	YES	8 S F.	SEAL EDGES
45	22A	NO	YES	8 S F.	SEAL EDGES
46	22A	NO	YES	8 S F	SEAL EDGES
47	22A	NO	YES	8 S F.	SEAL EDGES
48	22A	NO	YES	2 S F	SEAL EDGES
49	22A	NO	YES	6 S F.	SEAL EDGES
50	22A	NO	YES	2 S F	SEAL EDGES
51	22A	NO	YES	4 S F	SEAL EDGES
52	22A	NO	YES	4 S F.	SEAL EDGES
54	22A	NO	YES	4 S F.	SEAL EDGES
55	22A	NO	YES	2 S F	SEAL EDGES
56	22A	NO	YES	48 S.F.	SEAL EDGES
58	22A	NO	YES	3 S F.	SEAL EDGES
62	22A	NO	YES	2 S F.	SEAL EDGES
64	22A	NO	YES	2 S F.	SEAL EDGES
67	22A	NO	YES	2 S F.	SEAL EDGES

Note. Delamination is fireproofing whether sprayed or troweled no longer present on the steel members

WORLD TRADE CENTER
ELEVATOR SHAFTS ASBESTOS ASSESSMENT

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
70	22A	NO	YES	3 S.F.	SEAL EDGES
73	22A	NO	YES	2 S.F.	SEAL EDGES
78	22A	NO	YES	2 S.F.	SEAL EDGES
SPRAYED-ON MATERIAL			ABATEMENT OF SHAFT IS RECOMMENDED		

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
16	23A	NO	YES	2 S.F.	SEAL EDGES
17	23A	NO	YES	2 S.F.	SEAL EDGES
18	23A	NO	YES	2 S.F.	SEAL EDGES
19	23A	NO	YES	2 S.F.	SEAL EDGES
20	23A	NO	YES	2 S.F.	SEAL EDGES
21	23A	NO	YES	2 S.F.	SEAL EDGES
22	23A	NO	YES	2 S.F.	SEAL EDGES
23	23A	NO	YES	2 S.F.	SEAL EDGES
24	23A	NO	YES	2 S.F.	SEAL EDGES
25	23A	NO	YES	2 S.F.	SEAL EDGES
26	23A	NO	YES	2 S.F.	SEAL EDGES
27	23A	NO	YES	2 S.F.	SEAL EDGES
28	23A	NO	YES	2 S.F.	SEAL EDGES
29	23A	NO	YES	2 S F.	SEAL EDGES
30	23A	NO	YES	2 S.F.	SEAL EDGES
31	23A	NO	YES	2 S.F	SEAL EDGES
32	23A	NO	YES	2 S.F	SEAL EDGES
33	23A	NO	YES	2 S.F.	SEAL EDGES
34	23A	NO	YES	2 S.F.	SEAL EDGES
35	23A	NO	YES	2 S.F.	SEAL EDGES
36	23A	NO	YES	2 S.F.	SEAL EDGES
37	23A	NO	YES	2 S.F.	SEAL EDGES
73	23A	NO	YES	1 S F	SEAL EDGES
SPRAYED-ON MATERIAL			ABATEMENT OF SHAFT IS RECOMMENDED		

Note Delaminaton Is fireproofing whether sprayed or troweled no longer present on the steel members.

WORLD TRADE CENTER
ELEVATOR SHAFTS ASBESTOS ASSESSMENT

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
3	10B	NO	YES	6 S.F.	SEAL EDGES
4	10B	NO	YES	6 S.F.	SEAL EDGES
7	10B	NO	YES	8 S.F.	SEAL EDGES
12	10B	NO	YES	1 S.F.	SEAL EDGES
15	10B	NO	YES	2 S.F.	SEAL EDGES
19	10B	NO	YES	20 S.F	SEAL EDGES
20	10B	NO	YES	15 S.F.	SEAL EDGES
21	10B	NO	YES	26 S.F.	SEAL EDGES
22	10B	NO	YES	28 S.F.	SEAL EDGES
23	10B	NO	YES	15 S F.	SEAL EDGES
25	10B	NO	YES	48 S.F.	SEAL EDGES
29	10B	NO	YES	4 S F.	SEAL EDGES
29	10B	NO	YES	2 S.F.	SEAL EDGES
31	10B	NO	YES	2 S.F.	SEAL EDGES
34	10B	NO	YES	48 S.F.	SEAL EDGES
35	10B	NO	YES	48 S.F.	SEAL EDGES
36	10B	NO	YES	34 S F.	SEAL EDGES
37	10B	NO	YES	24 S.F.	SEAL EDGES
39	10B	NO	YES	48 S F.	SEAL EDGES
40	10B	NO	YES	48 S.F.	SEAL EDGES

SPRAYED-ON MATERIAL — ABATEMENT OF SHAFT IS RECOMMENDED

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
5	11B	NO	YES	1 S F.	SEAL EDGES
12	11B	NO	YES	1 S F.	SEAL EDGES
19	11B	NO	YES	2 S F	SEAL EDGES
25	11B	NO	YES	2 S F	SEAL EDGES
31	11B	NO	YES	48 S F	SEAL EDGES
33	11B	NO	YES	2 S F.	SEAL EDGES
40	11B	NO	YES	2 S F.	SEAL EDGES

SPRAYED-ON MATERIAL

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
ALL	5B	YES	NO	NONE	NONE
ALL	48B*	NO	YES	***	ABATEMENT

48B SHAFT-SPRAYED-ON FIREPROOFING
*** 1" - FOOT STRIP ALONG LENGTH OF COLUMN MISSING

Note. Delamination is fireproofing whether sprayed or troweled no longer present on the steel members

WORLD TRADE CENTER
ELEVATOR SHAFTS ASBESTOS ASSESSMENT

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
3	14B	NO	YES	2 S.F.	SEAL EDGES
4	14B	NO	YES	2 S.F.	SEAL EDGES
8	14B	NO	YES	1 S.F.	SEAL EDGES
9	14B	NO	YES	1 S.F.	SEAL EDGES
10	14B	NO	YES	1 S.F.	SEAL EDGES
11	14B	NO	YES	1 S.F.	SEAL EDGES
12	14B	NO	YES	1 S.F.	SEAL EDGES
13	14B	NO	YES	1 S.F.	SEAL EDGES
14	14B	NO	YES	1 S.F.	SEAL EDGES
15	14B	NO	YES	1 S.F.	SEAL EDGES
16	14B	NO	YES	1 S.F.	SEAL EDGES
17	14B	NO	YES	1 S.F.	SEAL EDGES
18	14B	NO	YES	1 S.F.	SEAL EDGES
23	14B	NO	YES	1 S.F.	SEAL EDGES
24	14B	NO	YES	1 S.F.	SEAL EDGES
25	14B	NO	YES	1 S.F.	SEAL EDGES
26	14B	NO	YES	1 S.F.	SEAL EDGES
27	14B	NO	YES	1 S.F.	SEAL EDGES
28	14B	NO	YES	1 S.F.	SEAL EDGES

SPRAYED-ON MATERIAL

FLOOR	SHAFT	FIREPROOFING INTACT	DELAMINATION	QUANTITY DELAMINATED	RECOMMENDATION
310	15B	NO	YES	4 S.F.	SEAL EDGES
3	15B	NO	YES	2 S.F.	SEAL EDGES
4	15B	NO	YES	4 S.F.	SEAL EDGES
22	15B	NO	YES	1 S.F.	SEAL EDGES
25	15B	NO	YES	8 S.F.	SEAL EDGES

SPRAYED-ON MATERIAL

Note Delamination is fireproofing whether sprayed or troweled no longer present on the steel members

THE PORT AUTHORITY OF NY & NJ

TWO WORLD TRADE CENTER, 37TH FLOOR
NEW YORK, NY 10048

(212) 435-7000
(201) 961-6600

October 18, 2000

R. W. Crandlemere & Associates
549 Columbian Street
Suite 305
Weymounth, MA 02190

RE: ASBESTOS DUE DILIGENCE: INFORMATION REQUEST.

Dear Mr. Crandlemere:

Please find attached the responses to your October 12, 2000 fax wherein you requested that the available asbestos information be broken down into seven areas. In addition, responses to your general information requests are also provided.

Request: **Total remaining and total removed ACM, broken down by material types and locations, within the designated areas as much as practical (e.g. by floor number or other description; such as within pipe chase or the elevator shafts).**

The attached breakdowns for 1 WTC, 2 WTC, 4 WTC, 5 WTC, MERs, Subgrade, and Concourse disclose the estimated amounts of asbestos-containing sprayed-on fireproofing and thermal system insulation material present. Drawings identifying these asbestos locations by sample number are on file in my office. Attachments disclosing the amounts of vinyl asbestos floor tiles present as of April, 2000 are also included. These estimates were provided by the Port Authority's Engineering Department, Asbestos Litigation Task Force, and the World Trade Department.

Asbestos-containing roofing material was removed from the MER set-backs in 1 and 2 World Trade Center, and the roofs of 4 and 5 World Trade Center. The roofs of 1 and 2 World Trade Center were not sampled.

Request: **The abatement costs for work performed and anticipated future abatement costs for each type of remaining known ACM.**

From 1986 to 1999, a total thirty one (31) contracts were bid, and a total of $58.2 million dollars was spent in abatement projects. The Engineering Department estimates the cost for vinyl asbestos floor tile removal to be between $5 - $6 per square foot, sprayed-on removal to be between $20 - $25 per square foot, and thermal system insulation to be $15 per linear foot (outer diameter dependant).

As of September, 2000, a total of 2,184,038 million square feet of sprayed-on fireproofing, and 3,500,000 million square feet of vinyl asbestos floor tile was removed. According to PA records, a total of seven million square feet of vinyl asbestos floor tiles were installed in the World Trade Center.

Request: **Materials determined not to be ACM (e.g. spline ceilings, hung ceilings, wallboard, wallboard joint compound, etc., as well as areas of sprayed-on fireproofing determined not to be ACM).**

Sampling of the building materials noted above did not disclose the presence of asbestos.

Request: **Any materials that are assumed to be ACM (such as fire doors) with an estimate, if possible, of the amounts of each material.**

Our presumption as to the types of asbestos-containing building materials within the World Trade Center did not include fire doors. Based upon sample data, asbestos containing building materials appear to be limited to sprayed-on fireproofing, thermal system insulation, and floor tiles and mastic.

Request: **Asbestos litigation status.**

Your information request has been forwarded to the Port Authority's Law Department. We will notify you accordingly.

The following information is in response to your fax dated Wednesday, October 18th.

Request: PCB-containing Hydraulic Fluid.

The hydraulic fluid (hydraulic oil # 32 AW) leaking from elevator FE-5, located on the B4 Level of 1 World Trade Center does not contain PCB. I have a copy of the Material Safety Data Sheet from the distributor; Consumers Oil, 515 South First Avenue, Mt. Vernon, N.Y.. Hydraulic elevator FE - 6 in 2 World Trade Center also uses hydraulic oil # 32 AW.

Relating to the trash compactors, please note that the hydraulic fluid is ordered through the Port Authority Stockroom from an approved list of chemical products established by the Inspection & Safety Division. The hydraulic fluid used for the trash compactors is either mineral or vegetable based. Both are non-PCB products.

Request: Additional Information Regarding Radio-Frequency Testing.

I do not have a copy of, nor do I have knowledge of the March ,1999 report prepared by Denny & Associates recommending additional RF exposure monitoring. All radio-frequency documents are available for your review in the Document Room.

Please contact me at (212) 435-8507 should you have any questions or require additional information.

Phil Taylor
World Trade Operations &
Maintenance Management

Cc: J. Connors, A. Reiss, L. Zucchi

5 WTC

Excluding MERs, Truckdock, Subgrades, and Elevator Shafts

Location	Floors	Amount

There is no sprayed-on fireproofing in 4 WTC.

Thermal system insulation is in the form of pipe saddles in 4 WTC. Quantities not determined.

A cementitious patch of less than 160 sqft exists on a beam in the south wing of the southwest portion of the 5th floor in 5 WTC.

1, 2, 4, and 5 WTC

Mechanical Equipment Rooms

1 WTC:

7th / 8th Floor MER	25,000 sqft of sprayed-on / TSI present but quantity unknown
41st / 42nd Floor MER	25,000 sqft of sprayed-on / " " " " "
75th / 76th Floor MER	25,000 sqft of sprayed-on / " " " " "
108th / 109th Floor MER	25,000 sqft of sprayed-on / " " " " "
TOTAL:	100,000 sqft of sprayed-on / TSI quantity unknown*

* Non-fiberglass wrapped piping components, such as elbows, fittings, and flanges contain asbestos.

2 WTC:

41st / 42nd Floor MER	25,000 sqft of sprayed-on / TSI present but quantity unknown
TOTAL:	25,000 sqft of sprayed-on / TSI quantity unknown*

* Non-fiberglass wrapped piping components, such as elbows, fittings, and flanges contain asbestos.

4 WTC:

Non-ACM

5 WTC:

Non-ACM

1, 2, 4, and 5 WTC

SUBGRADES and TRUCKDOCK

Subgrades -

1 WTC:

B1 Level – Core, and N/E Quadrant	5,000 sqft / No TSI
B6 Level – Entire Level	40,000 sqft / No TSI
TOTAL:	45,000 sqft / No TSI

2, 4, and 5 WTC: No ACM

Truckdock -

Main Truckdock	50,000 sqft

1, 2, 4, and 5 WORLD TRADE CENTER

VINYL ASBESTOS FLOOR TILES

Amount Remaining in 1 WTC:	710,677 sqft
Amount Remaining in 2 WTC:	1,734,032 sqft
Amount Remaining in 4 WTC:	241,000 sqft
Amount Remaining in 5 WTC:	167,515 sqft

WTC 5
VAT ABATEMENT STATUS DIAGRAM

5WTC FLOORS	ABATED Sq Ft VAT IN CLAIM	JOB NUMBERS IN CLAIM	ABATED Sq Ft VAT NOT IN CLAIM	JOB NUMBERS NOT IN CLAIM	REMAINING Sq Ft VAT ON FLOOR	6WTC FLOORS
8	16,222.00	812			17,314.00	8
7					-	7
6					69,359.00	6
5					77,504.00	5
4					-	4
3					-	3
PLAZA					3,338.00	PLAZA
CONCOURSE						CONCOURSE
TOTALS	16,222.00				167,515.00	

PORT AUTHORITY

OCT-18-2000 18:16

APPENDIX B

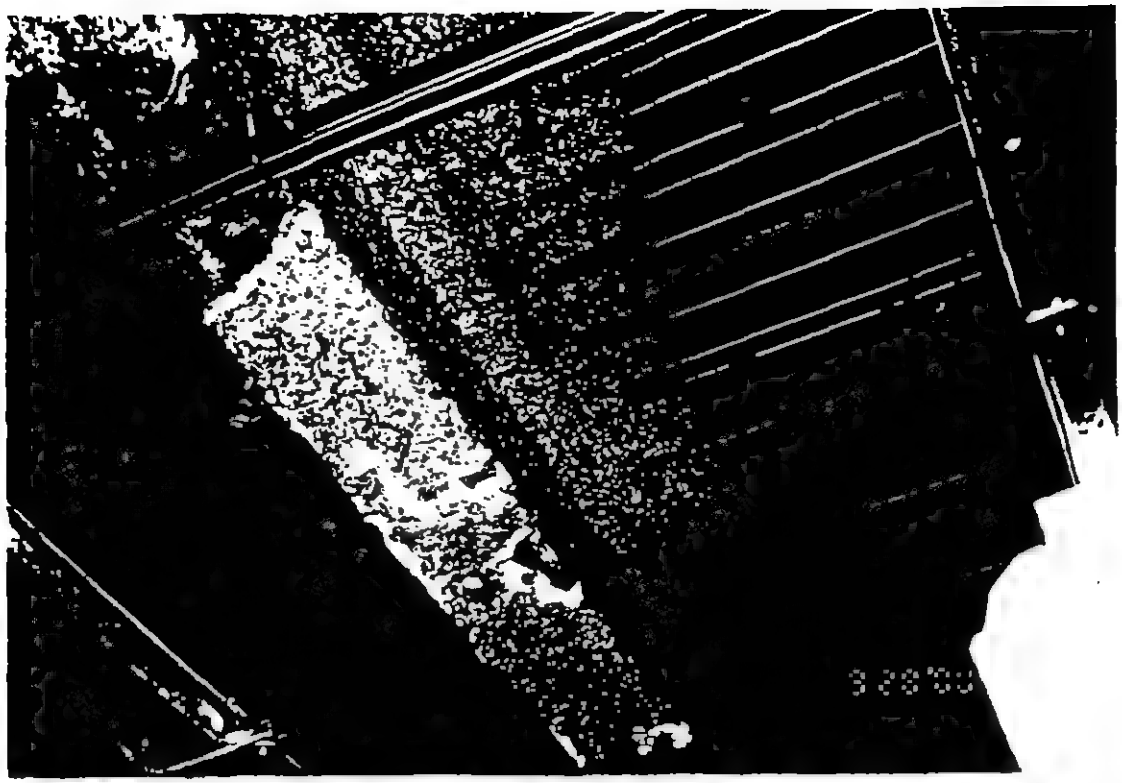

Photo #1: Spray-on fireproofing, third floor – Five World Trade Center.

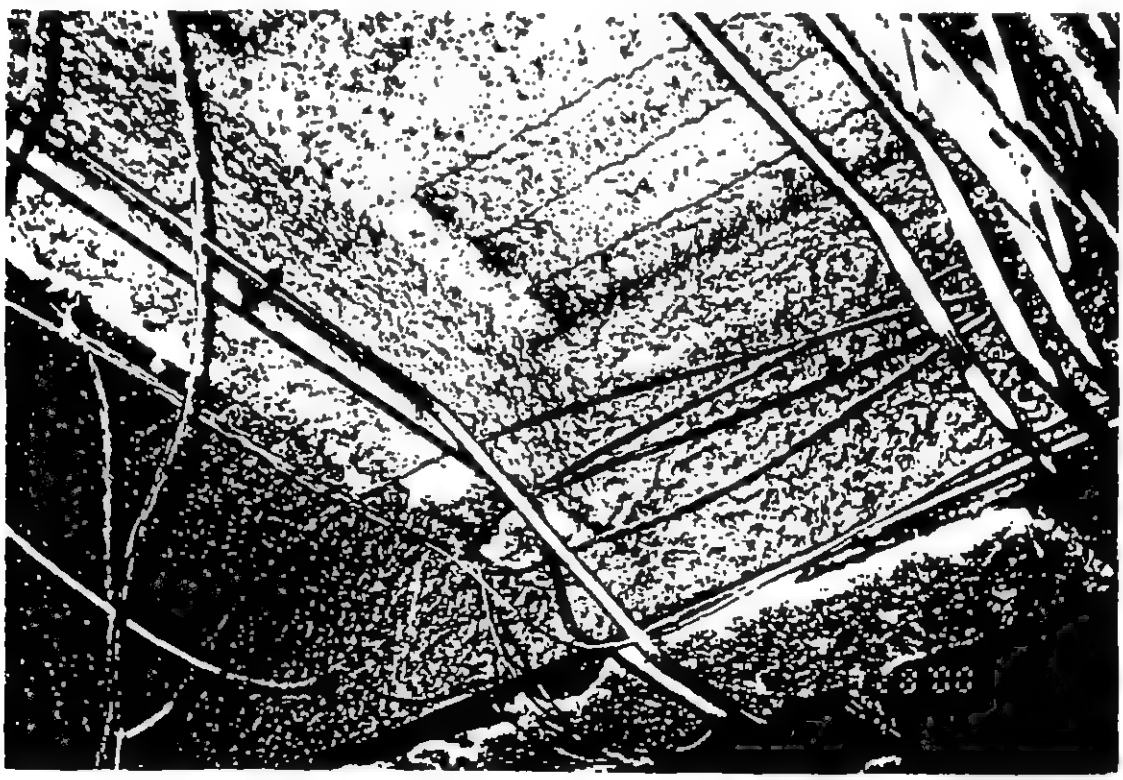

Photo #2: Spray-on fireproofing, third floor – Five World Trade Center

ATTACHMENT 8

Heitmann & Associate Curtain Wall Evaluation

HEITMANN & ASSOCIATES, INC.
BUILDING ENCLOSURE CONSULTANTS
HONG KONG • NEW YORK • ST. LOUIS

EXECUTIVE SUMMARY

Five World Trade Center

New York, New York

Curtain Wall Evaluation
6 November 2000

The results of our on-site evaluation of the current condition of the curtain wall system on the Five World Trade Center project is summarized as follows.

Having been regularly maintained and inspected the general condition of the curtain wall on the building is relatively good. The curtain wall system appears to be structurally sound and generally air and water tight. The main issues of concern relate to the external appearance of the curtain wall and ongoing maintenance issues.

The original finish on the curtain walls is a bronze or black anodize which has been painted during the life of the building. Over the years the paint has begun to peel in isolated areas. The failed areas of paint can be repaired to improve the appearance of the building.

The current inspections address issues of water leakage, sealant deterioration, gasket deterioration and damage to the curtain wall. Areas of water leakage appear to be minimal and randomly located, indicating no consistent or typical problem. Sealant and gasket deterioration are currently dealt with on an "as needed" basis. Given the age of the sealants and gaskets it is likely that spot replacement/repairs will continue to be necessary until ultimately all the areas have been replaced or repaired. Thus, it would be appropriate to consider addressing all sealant and gasket issues in one comprehensive remedial program covering all of the building. It is felt that the damage to the curtain wall is being caused by the window washing platform. Thus, modifications should be made to the window washing platform and/or the curtain wall to prevent further damage to the curtain wall.

Our full report will address these issues in greater detail.

Respectfully submitted,
HEITMANN & ASSOCIATES, INC.

William G. Young

William G. Young
Manager, East Coast Office

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Project :	**Five World Trade Center** New York, New York
Project Number:	20063.00
Observation Dates:	Various dates between September 13, 2000 and November 2, 2000
Report Prepared By:	William G. Young

Heitmann & Associates, Inc. has performed an on-site evaluation of the current condition of the curtain wall system at the Five World Trade Center project. Our evaluation has included the review of the original project construction drawings (as provided on CD ROM.), review of curtain wall inspection reports provided by the Port Authority of New York and New Jersey, interviews with the Building Engineers and visual inspections. The visual inspections were made from the street/plaza level using binoculars, the main roof, random interior locations of both finished and unfinished spaces. No shop drawings for the curtain wall system were available for review. No drops were made using the building's exterior maintenance platform. Our comments and observations noted during the evaluation are summarized as follows.

(Note: All photographs are provided to indicate/clarify typical conditions and may depict conditions from either Four or Five World Trade Center, unless noted otherwise.)

I. General Project Description

A. The design project Architect was Minoru Yamasaki & Associates. The construction of the project was completed in approximately 1975. No shop drawings for the curtain wall system were available for review. However, we believe that the curtain wall systems for Four and Five World Trade Center were supplied by different subcontractors. Based on discussions with former and present Cupples employees, we believe that the curtain wall on either Four or Five World Trade Center was supplied and installed by Cupples Products of St. Louis, Missouri. Cupples Products is still in operation under a new organization. We have no information as to which company supplied the curtain wall system for the other building.

B. The curtain wall is an aluminum framed stick system consisting of monolithic glass vision panels, aluminum spandrel panels at the floor lines, aluminum fascia panels and louvers. The curtain wall incorporates a series of major and minor mullions. The larger, major mullions enclose the building's structural pipe columns. The major mullions occur in pairs with the pairs being separated by smaller minor mullions (Refer to photographs 1, 2, 3 and 4).

C. The finish on the curtain wall framing, spandrel panels, column cladding (at base of building), fascia panels (at levels 4 and 9) and roof parapet panels is a bronze/black paint finish. Based on discussions with the Port Authority Engineering and Maintenance personnel, we believe that the paint finish was field applied approximately ten years ago. The original finish which is still visible on the top and backside of the roof parapet cap appears to be a bronze/black anodized finish.

D. The vision glass appears to have a light grey or bronze body tint. The interior seal around the glass perimeter is provided by neoprene glazing gaskets.

E. At the typical floors, the interior side of the major mullions is enclosed with an aluminum cover. The finish on the interior aluminum cover at the major mullion is a clear/natural anodize (Refer to photographs 5 and 6). The finish on the interior side of the minor mullion is a bronze/black anodize (Refer to photograph 7).

F. The line of the exterior wall at the base of the building is set back under the floors above. The soffit between the two planes of the exterior wall is clad with plaster supported by metal framing (Refer to photographs 8 and 9).

G. The glass panels are cleaned using a window washing platform suspended from the roof (Refer to photograph 10). A continuous track around the perimeter of the roof provided access to all of the curtain wall system.

II. Document Review

A. Inspection Reports

1. In compliance with Local Laws 10 and 11, the Port Authority of New York and New Jersey maintains a program of regular inspections for the curtain wall system. The inspections are performed by representative of Leslie E. Robertson Associates, R.L.L.P (LERA) Consulting Structural Engineers. Leslie E. Robertson was one of the original structural engineers for the project. The main issues addressed by the inspections are summarized as follows.

   a. Condition of sealant joints.

      (1) Failed sealants are noted at various locations. Sealant failures typically occur at the joints in the fascia panels and roof parapet caps.

b. Damage to mullions and aluminum panels.

(1) Dents and scratches are noted on the mullions and aluminum panel cladding at various locations on the building. LERA theorizes that the damage to the curtain wall was caused by the building's window washing platform. In addition to the dents and scratches caused by the window washing platform, there are areas where the edge of a fascia panel or parapet cap is bent/pulled upward.

c. Glass and glazing gasket issues.

(1) Damaged (cracked and broken) glass was noted in the inspection reports. Additionally, many locations are noted where the interior glazing gaskets have dropped out of the glazing pocket.

d. Condition of curtain wall finish.

(1) The field applied paint finish is in generally good condition over the majority of the curtain wall. However, the inspection report indicates areas where the paint finish has peeled off. It is recommended in the inspection report that the failed portions of the paint finish be repaired.

(2) Staining of the aluminum panels at the exterior window sill of levels 4 and 9 was noted. The stains appear to be a result of pigeon droppings.

e. Misalignment of major mullions.

(1) Slight misalignment of the major mullions was noted at the joint between levels 8 and 9.

f. Cracks in the marble panels.

(1) A small area of the wall surface that sets back under level 4 is clad with marble panels. Several of the panels have developed hairline cracks. At several locations there is an offset between the edges of adjacent panels. There is no indication that the hairline cracks have adversely affected the structural integrity of the marble panels or their attachments.

g. Structural support of the plaster soffit.

(1) While no significant problems were noted concerning the condition of the plaster soffit, LERA does indicate that the existing steel support system would not be adequate if the design were required to meet current wind load requirements. The Port Authority has acknowledged the situation and given the good condition of the plaster finish and the longevity of the existing support system has determined that no modifications were required.

2. The conditions noted above are generally repaired on a spot basis following each inspection depending on how critical the situation is relative to safety or performance of the curtain wall system. Thus, issues relating to aesthetic concerns may not be repaired immediately.

III. Interviews

A. Discussions with Port Authority personnel as well as facility managers for some of the main tenants indicated that isolated cases of water leakage had occurred in the past and had been repaired. There were no complaints of ongoing water leakage through the curtain wall system.

IV. Inspections

A. Interior inspections.

1. Random areas of the curtain wall were inspected from the interior of the building to check for signs of water leakage or other indications of deterioration. Areas were inspected based on accessibility and included both finished and unfinished spaces. Our observations are summarized as follows.

a. No significant signs of water leakage were noted at any of the finished spaces.

b. A number of locations were noted where the interior glazing gasket had dropped out of its pocket at either the top or side of the vision glass panel (Refer to photographs 6 and 11). This condition is a result of the glazing gasket having taken a compressive set and lost some of its flexibility. Additionally, the original design may not have had sufficient engagement between the glazing gasket and the window frame. Thus, under a negative wind load the glass is pressed against the outer gasket, compressing it and opening up the gasket pocket on the interior allowing the gasket to drop out. As the primary function of the interior gasket is to provide a separator between the glass and

metal frame, the existing gaskets could be reinstalled using a few small beads of silicone sealant to secure the gasket in place.

B. Exterior Inspections.

1. The exterior visual inspections were made from the street/plaza level using binoculars and the roof. Our observations are summarized as follows.

   a. In general the curtain wall system appears to be in good structural condition with no obvious signs of failure.

   b. Our inspection revealed on broken or cracked glass panels. Thus, previously noted by LERA appear to have been replaced.

   c. The condition of the visible sealant joints was generally fair to poor. At the panel joints the sealant is frequently extruded out of the joint (Refer to photographs 12 and 13). At the parapet caps many of the sealant joints have failed (Refer to photograph 14). During the refinishing process the paint was applied directly over the sealant joints. As the paint is not as flexible as the silicone sealant and does not adhere to the silicone sealant, it eventually cracks and peels away.

   d. The general condition of the paint finish is good. Areas of failed paint are typically fewer and smaller on Five World Trade Center than on Four World Trade Center (Refer to photograph 13). Staining of the sill at levels 4 and 9 by pigeon droppings is a significant problem on some elevations (Refer to photograph 15).

   e. Damage to the aluminum panels is severe in some areas (Refer to photograph 16). This type of damage is caused when the window washing platform catches on the bottom edge of a panel or cap as the platform is being raised back up to the roof. Other damage is caused by the window washing platform swinging back and forth in the wind and banging into the curtain wall. Based on our observations neither the window washing platform nor the curtain wall incorporate tie backs to prevent the platform from swinging excessively and causing damage to the curtain wall.

   f. Not all the distortion visible in the aluminum fascia panels was caused by the window washing platform. In the majority of cases, the distortion is a result of the aluminum panels not being flat (Refer to photograph 17). This condition is most likely inherent in the original manufacture or installation of the panels.

g. The plaster soffits are in generally good condition. There are no visible signs of cracks or distortion of the surface. There are some areas where holes have been cut in the soffit and have yet to be repaired.

h. The marble clad portions of the exterior wall appear to be in generally good condition. The hairline cracks and misalignment between panels do not appear to have resulted in any significant structural problems that require attention.

V. Summary

A. Based on our onsite observations and evaluation of the documents, the overall condition of the curtain wall system is generally good. While there are ongoing maintenance issues to be addressed, there do not appear to be any significant structural or waterproofing issues that require attention. Nothing in our observations or evaluations leads us to believe that the structural adequacy of the curtain wall will deteriorate significantly in the foreseeable future.

B. It is likely that paint finish, joint seals and interior gaskets will continue to gradually deteriorate with time. To minimize future maintenance, it would be possible to implement a remedial program that would address these issues over the entire building. The paint finish could be repaired as necessary, all existing seals could be cut out and replaced, and the interior gaskets could be replaced or reset in silicone sealant.

C. Our recommendations regarding the issues noted during our inspections are summarized as follows.

1. Water leakage - As there does not appear to be any significant or typical water leakage problems, we recommend that water leaks continue to be addressed as they are reported. A remedial program that addresses sealant repair and replacement for the entire tower would reduce the potential for future water leakage.

2. Interior gaskets - The dropping out of the interior glazing gaskets is a minor issue and can be corrected by reinstalling the existing gasket into the glazing pocket with a few small beads of silicone sealant.

3. Sealant joints - While the overall condition of the sealants is poor due to its age and type, actual failures are isolated. Thus, the sealant could continue to be addressed on an "as needed" basis or all sealants could be replaced as part of an overall remedial program.

4. Paint finish - While this is primarily an aesthetic issue, we recommend that failed areas of the paint finish be repaired to prevent further deterioration of the surrounding finish.

5. Marble cladding - The problems noted in the marble clad areas are primarily aesthetic and do not require any immediate action.

6. Window washing platform - Modifications should be made to the window washing platform and/or the curtain wall to prevent damage to the aluminum panels, parapet caps and mullions. The modifications to the window washing platform could include additional safety switches to stop the platform if it becomes caught on an aluminum panel or cap, the addition of rollers on the ends of the platform and/or additional or larger rollers on the front of the platform. Intermittent tie backs could be added to the curtain wall to minimize the swinging of the platform.

While our inspections and evaluations have covered a random sampling of conditions, we believe that our findings are representative of the entire curtain wall system. Should any additional information or clarification be required, please feel free to contact our office.

Respectfully submitted,
HEITMANN & ASSOCIATES, INC.

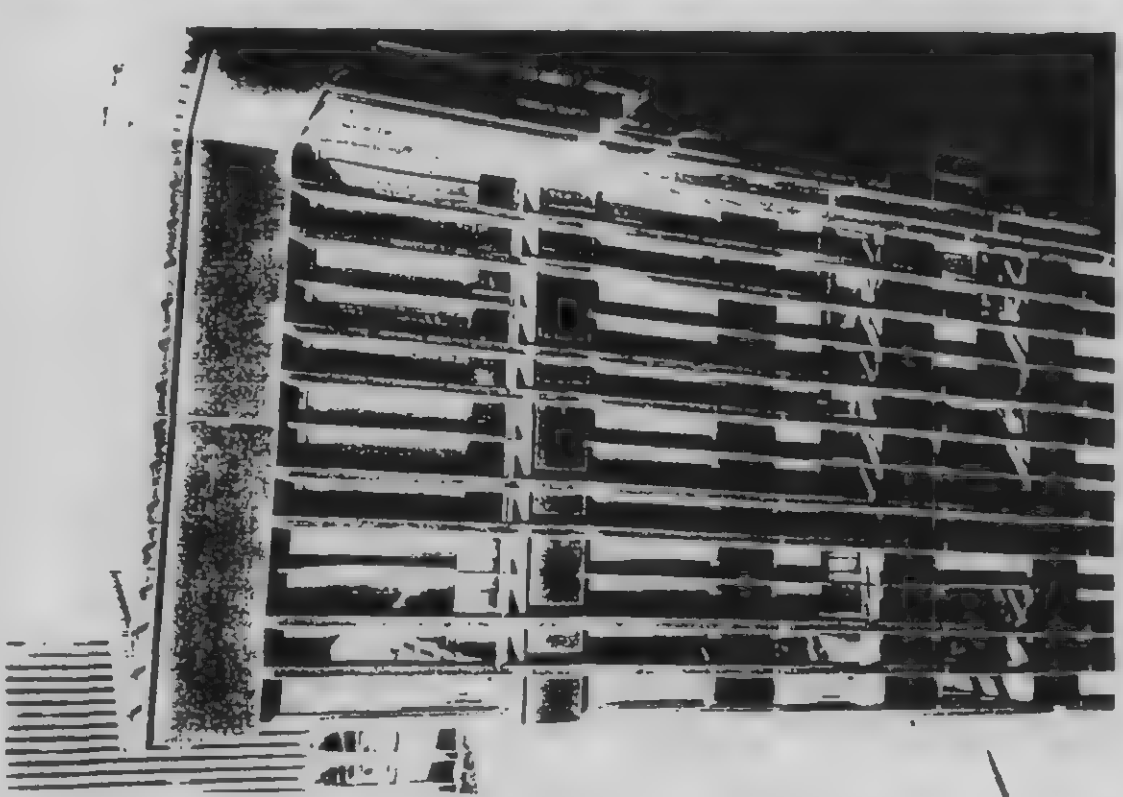
William G. Young

William G. Young
Manager, East Coast Office

Attachments

Four & Five World Trade Center
(HAI Project #20063.00)

1



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Four & Five World Trade Center
(HAI Project #20063.00)

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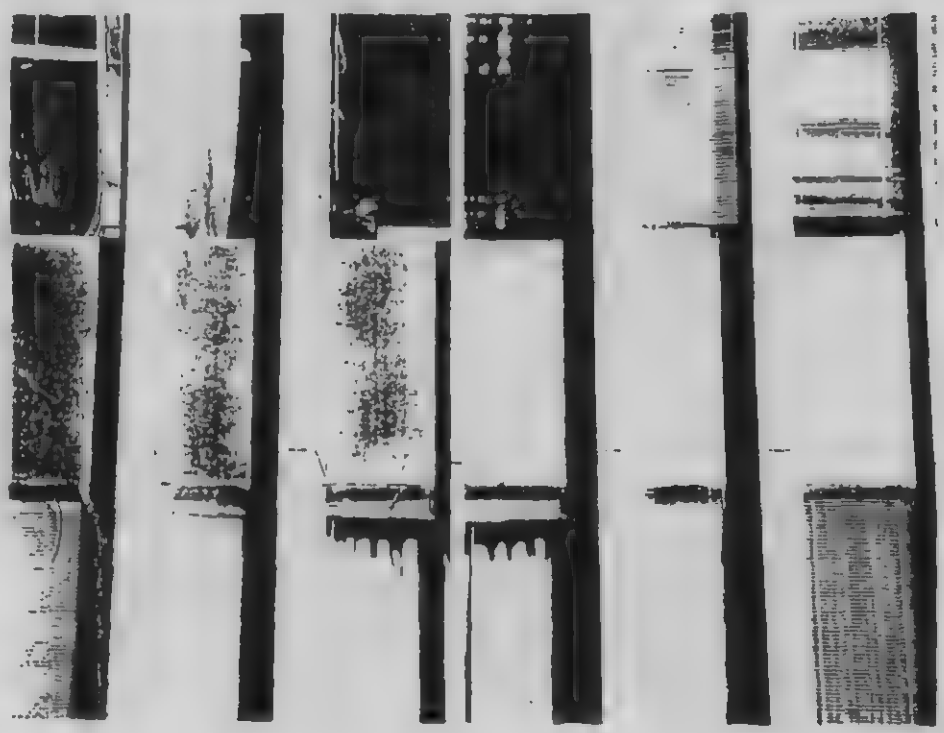

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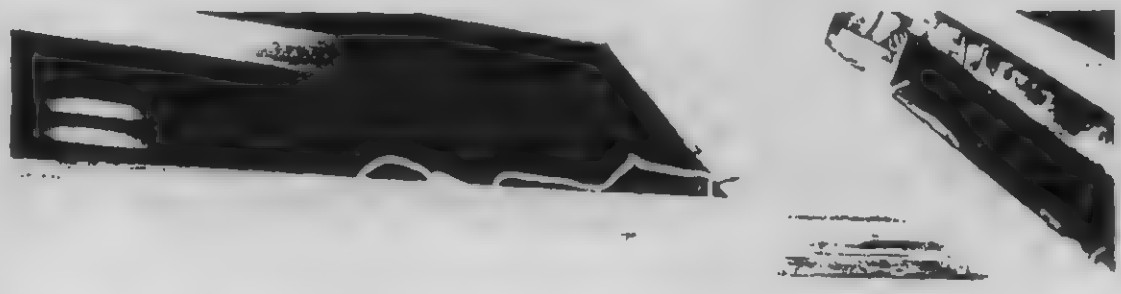
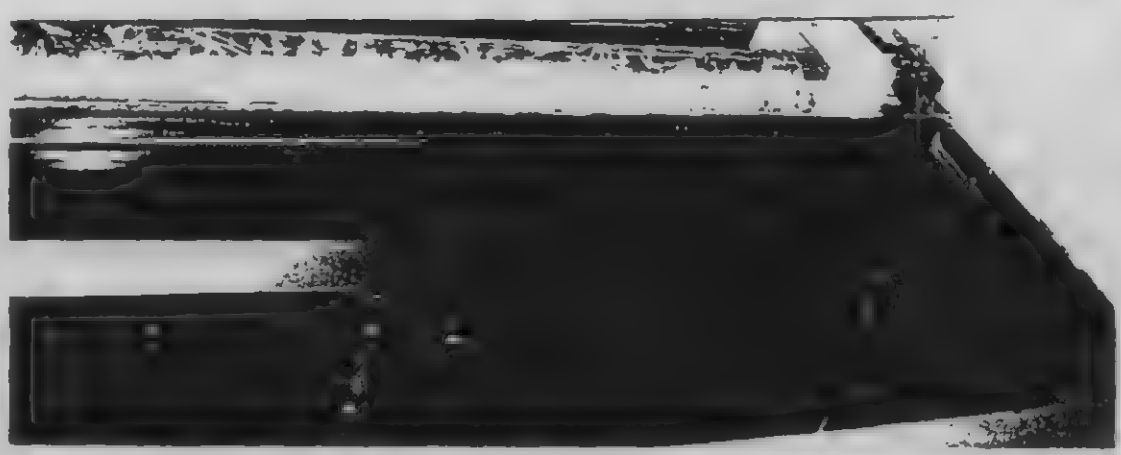
Four & Five World Trade Center
(HAI Project #20063.00)





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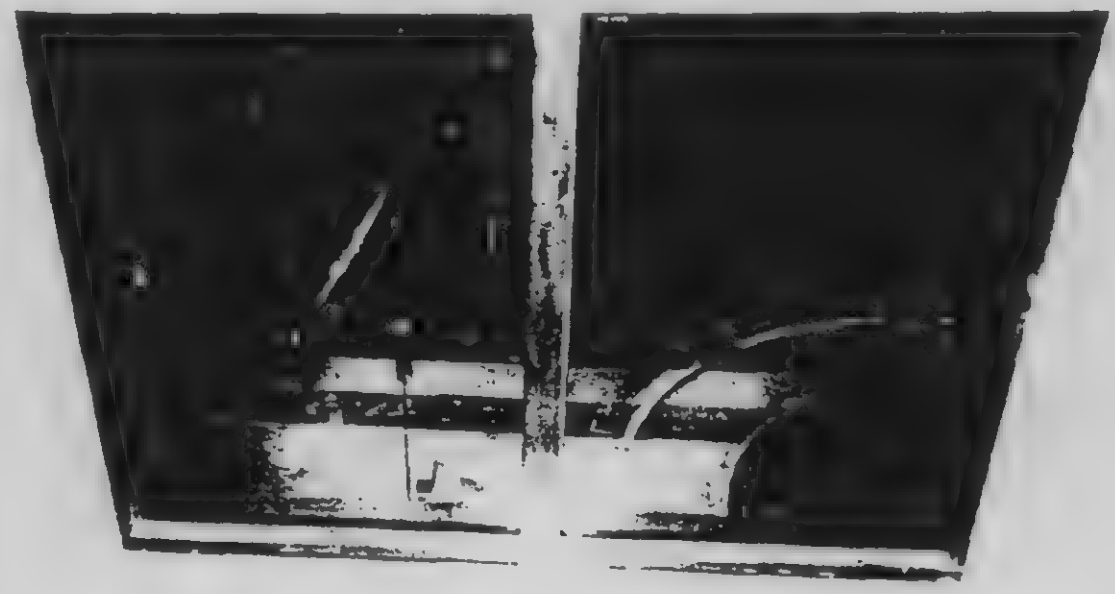
Four & Five World Trade Center
(HAI Project #20063.00)



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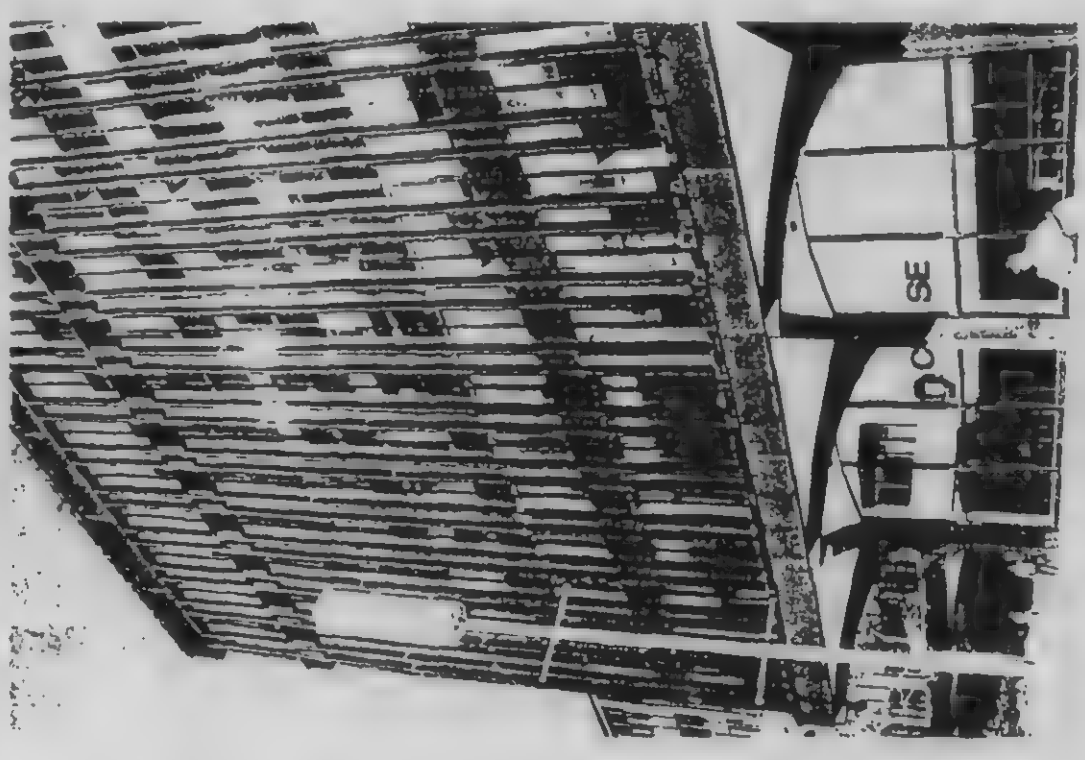

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Four & Five World Trade Center
(HAI Project #20063.00)

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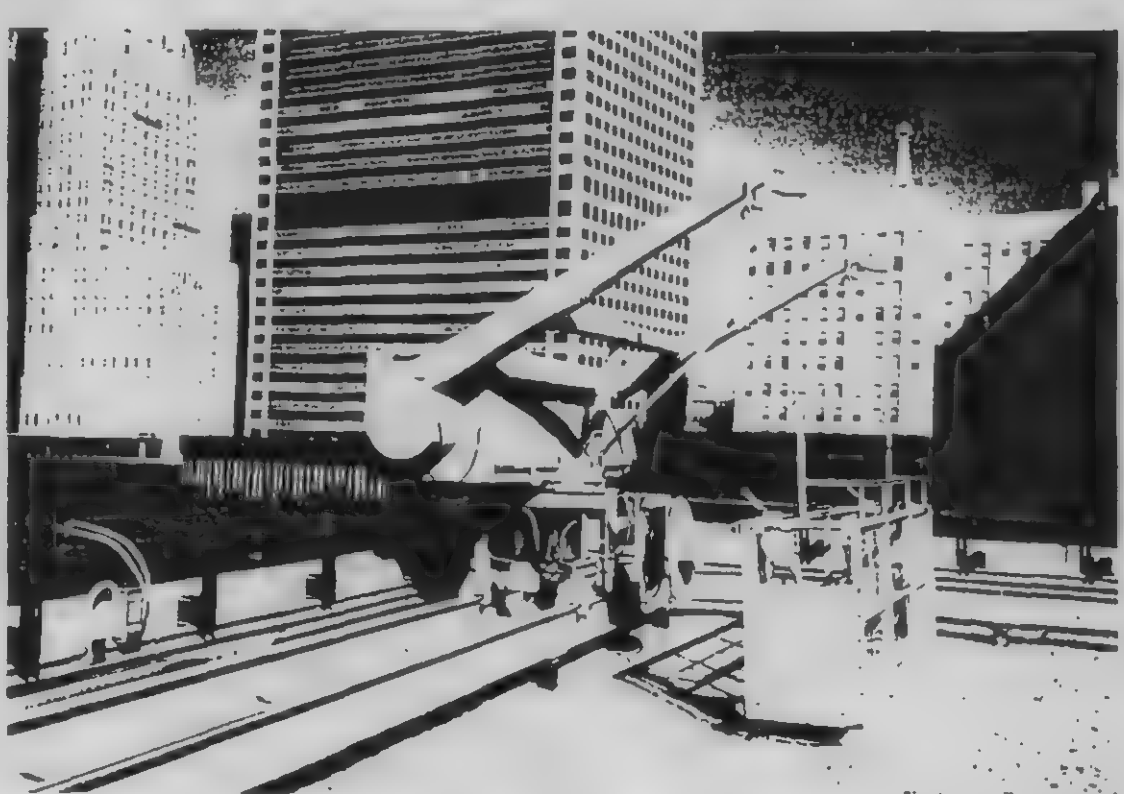

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Four & Five World Trade Center
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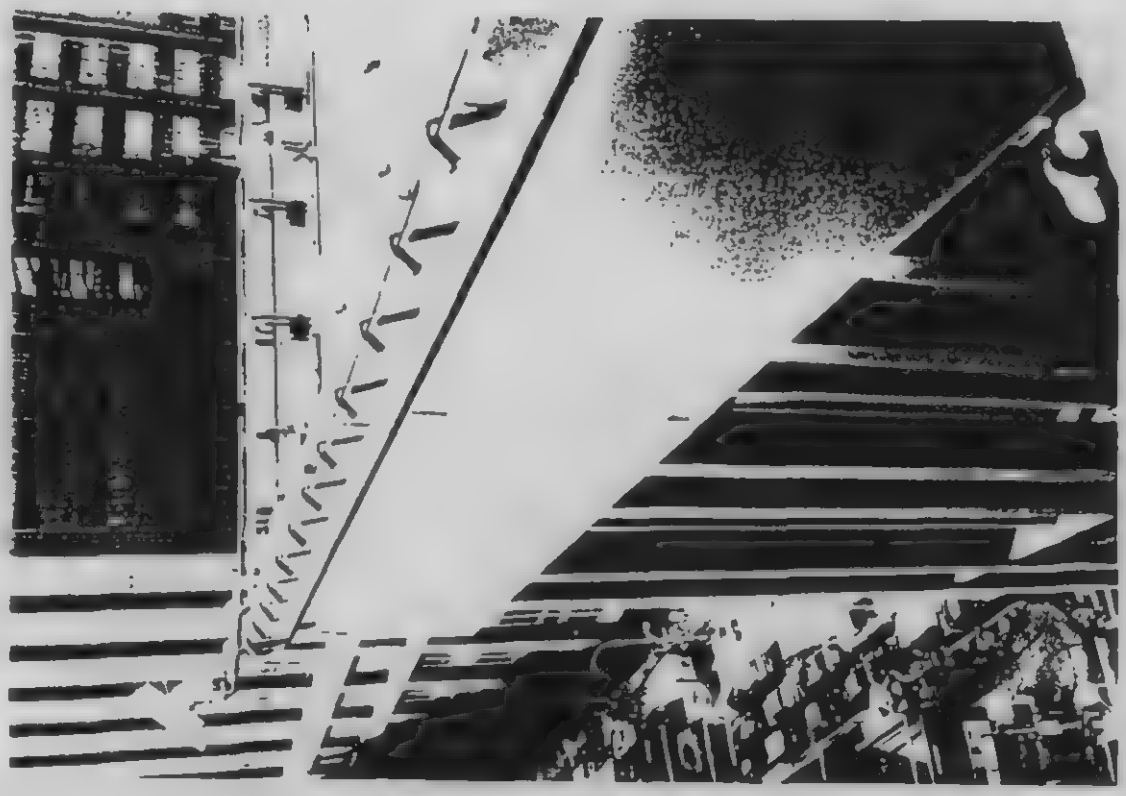

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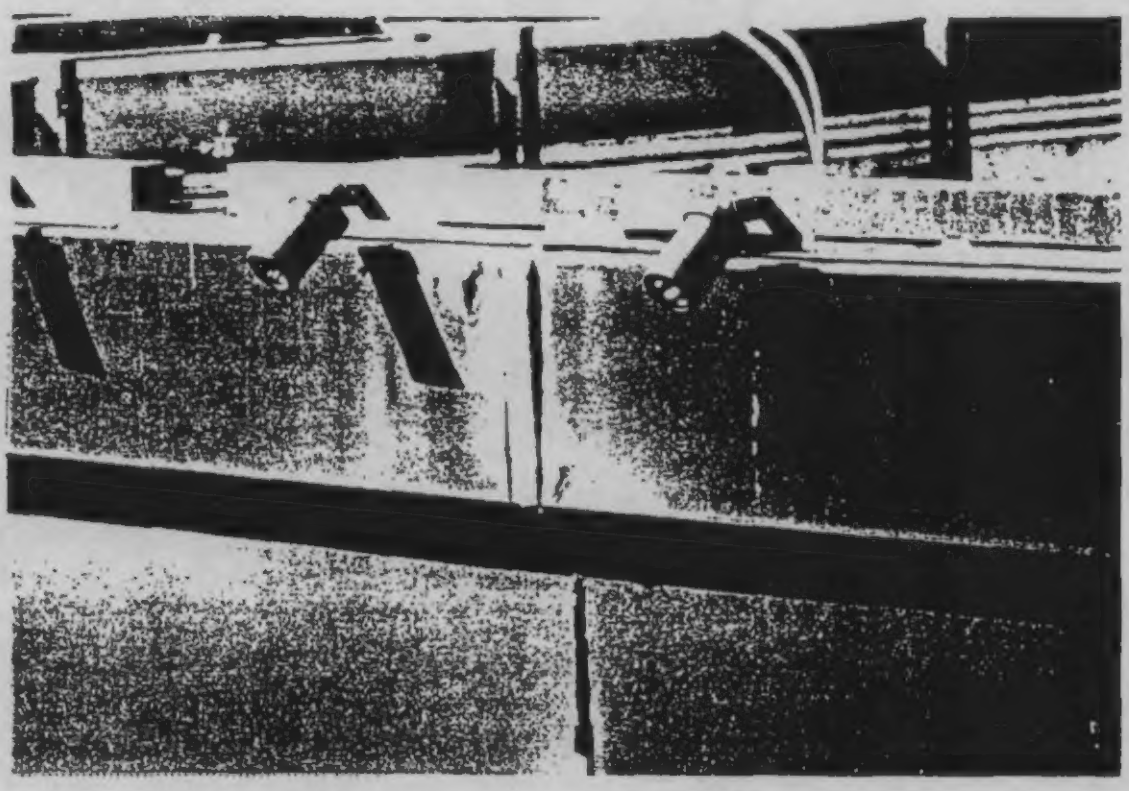
Four & Five World Trade Center
(HAI Project #20063.00)



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Four & Five World Trade Center
(HAI Project #20063.00)

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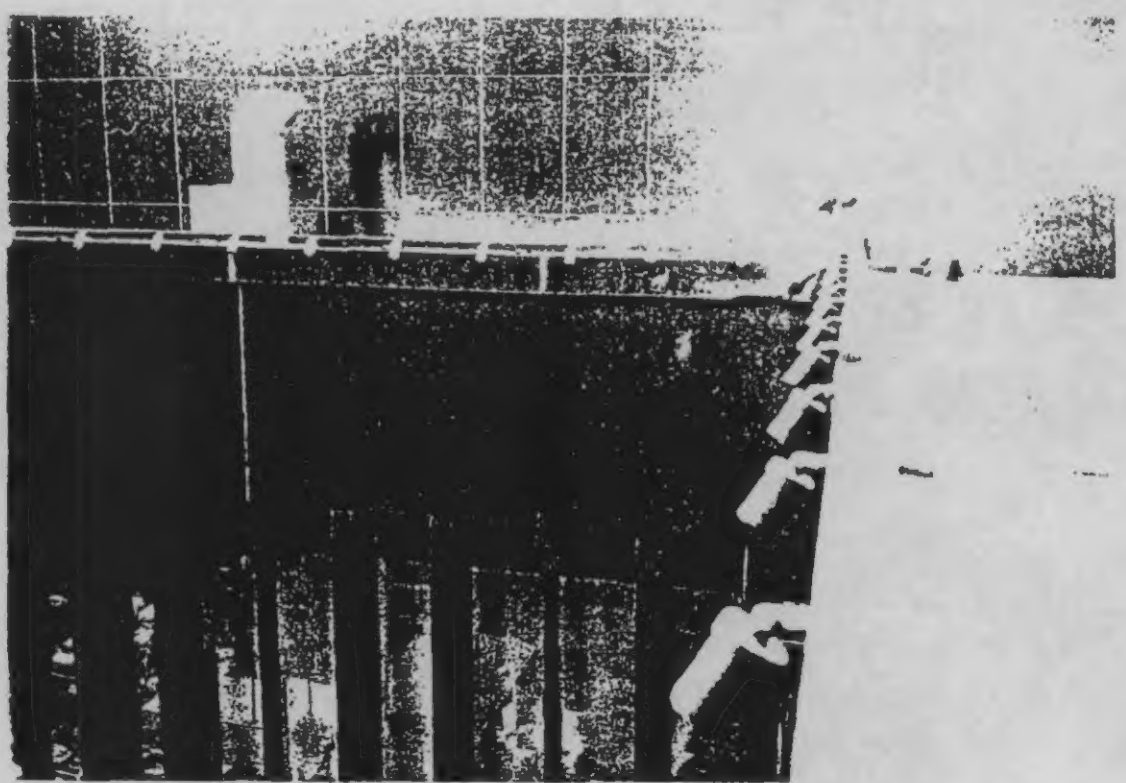

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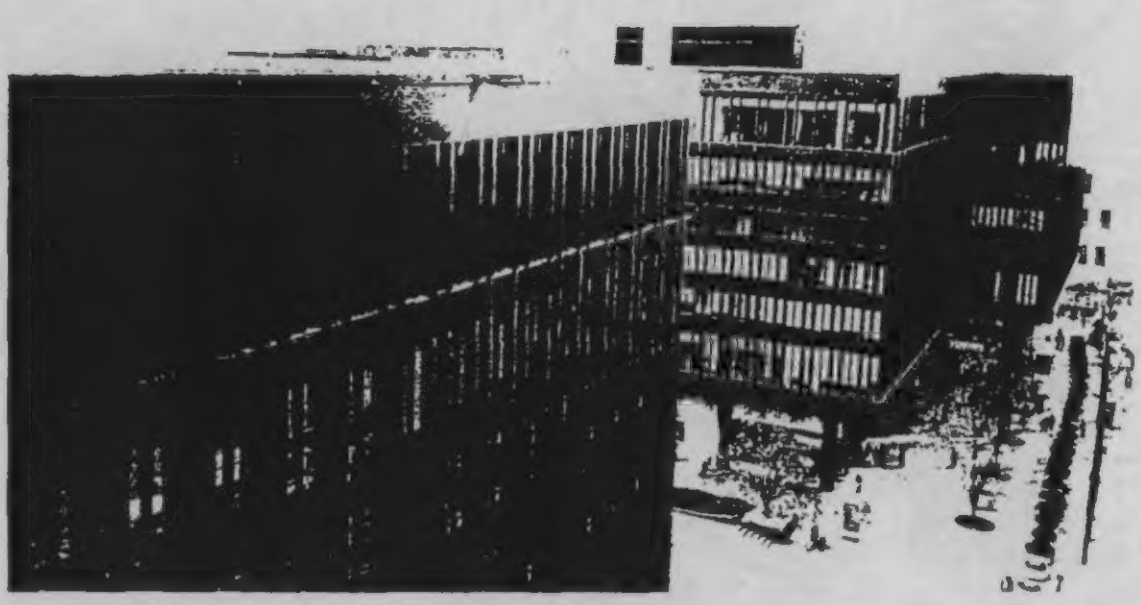
Four & Five World Trade Center
(HAI Project #20063.00)



17

NOT USED

18